AUTOMOTIVE INDUSTRIES
Volume 65 September 19, 1931 Number 12

JUNK IT? SEARCH ME!

And it Shouldn't Be Assumed That the Supervisor Doesn't Know His Job: There Are No Standards To Tell Him When a Part Has Finished Its Useful Life

by
Joseph Geschelin

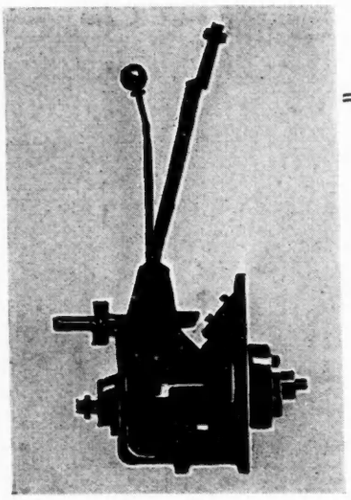
THERE will be $1,550,000,000 spent in 1931 for repair parts and supplies. $2,330,000,000 may go for labor in utilizing these materials in the vehicle maintenance field.*

Would it jar you to know that much of this vast sum will be spent blindly, inefficiently. At least, that's the opinion of several large vehicle fleet operators. Perhaps more should go for parts with a saving in labor. We don't know, because in this field there exists no basis for comparison.

Take the case of one of the biggest fleet operators in the country: A breakdown occurs. The vehicle must get back on the road quickly —with lowest possible expense. Does the service man or the repair-inspector know what the minimum cost should be? How can he, when no one has set up instructions to show what parts may be salvaged; what may be safely used, and how much should be replaced without question? The same question arises daily in routine repair work.

How can the issue be met? The consensus is that there is a crying need for a sensible, practical code of instructions for maintenance operations. And if

*Forecast in the Statistical Issue, *Automotive Industries*, Feb. 28, 1931



Where Repair Inspection Standards Might Apply on Transmissions

Sliding-gear clearance on square main shaft
Sliding-gear clearance on splined main shaft
Sliding-gear clearance on sides of splined main shaft
Concentricity of main shaft and bearing surfaces
Main shaft must run true on centers within
Main shaft pilot-bushing clearance on shaft
Clutch gear and shaft must run true on centers within
End play in clutch gear shaft
End play in main shaft
Back lash of transmission gear teeth
Radial clearance of transmission bearings
End play of transmission bearings
Clearance of countershaft bushings on shaft
Clearance of idler gear bushing on shaft
Countershaft must run true on centers within
End play in countershaft
Clearance of shifter rod bearings

one is devised it must come from the manufacturer. Otherwise it will have no standing.

Moreover, lest we underestimate the tangible value of such a code, consider that most smart operators are learning to buy vehicles on the basis of service experience. It does seem wise to give them a factory-built yardstick of performance in place of their rule-of-thumb. Particularly if a code resulting from research will get the most out of your product.

Suppose we call this code Repair Inspection Standards, for want of a better name. What would it look like? Briefly, it would consist of a system of factory-approved clearances, and tolerances on fits for the vital reciprocating, oscillating and revolving elements of a vehicle. To establish these standards it will be necessary to set up an engineering study to determine the wear life at these points. The data could be expressed in the following form:

a. Desirable limits. These will be about the same as normal factory practice.
b. Serviceable limits. This would specify the condition of normal wear without impairing correct functioning.
c. Repair or replace. This would specify the maximum wear or clearance between mating parts beyond which it is not safe to operate.

Some engineers are opposed to this in principle because it will involve an appreciable strain on the budget of the engineering department. Consequently, among other things we propose to show later in the article some very strong economic justifications for any reasonable expense that might be incurred.

Before plunging into the technical aspect of this discussion, we should like to leave this thought: that some astute sales manager who can visualize the possibilities of this service will cash in on it in the form of new sales. Surely it would be a powerful argument indeed for any truck salesman to tell his prospect that his product carries with it a unique service—repair inspection standards which will save hundreds of dollars each year in maintenance expense. Remember this, too, that the larger fleet owners measure truck values in terms of service. Isn't it far better to give them a yardstick of your own making than some crude, unscientific one of theirs?

What is the present status of maintenance standards? Actually there is very little authoritative data available. Several manufacturers, as for example, Cadillac, Sterling and White, have included some repair inspection data in their service bulletins. Another example is the Ford Service Bulletin, July, 1931, which gives the clearances and limits used in the assembly of Model A engines. However, this gives only the original factory clearances. Early this year the *Automobile Trade Journal* (April, 1931) published a collection of new maintenance data, and was literally swamped with requests for reprints from service stations all over the country. A large number of suggested standards of great value in pointing out some

of these essential elements are given by C. T. Schaefer.*

Now some engineers say that the setting up of a rational system of repair inspection standards is not a practical matter, due to the difficulty in getting such data together, and also because of wide variations in service conditions. Too, the engineer is very much concerned about the cost involved. Granting that operations do differ widely, there is still a crying need for standards which might represent the best practice, the intelligent maintenance man can then adapt them to suit his conditions.

Certainly some yardstick is needed, and it would seem to be much better all around if the yardstick were to be designed by the manufacturer rather than the user. One important truck manufacturer started a study of this kind some short time ago but found it necessary to abandon it temporarily. From all accounts, the objective was very ambitious; one of the aims was a replacement limit based on total mileage with suggested adjustments in mileage depending upon operating conditions.

Now, as a matter of fact, precisely this type of standard has been in operation in the air transport field for a number of years. Of course, other considerations enter in this field, the chief one being safety. But the fact remains that rational standards have been established accurately enough so that parts are automatically replaced after a certain given number of flying hours.

The Germans went into this matter thoroughly some time ago due to the emphasis on maintenance and operating cost. A very instructive discussion of manufacturing tolerances and their relation to the wear life of wearing parts appeared in *Der Motorwagon*, June 30, 1929. The author's conclusions are that closer manufacturing tolerances mean longer wear and life. Wide tolerances between mating parts mean that the life of the element is reduced before it is placed in service.

*The Automotive Mechanics Handbook, 1929, Harper & Bros., publisher.

Repair Inspection Standards may be defined as

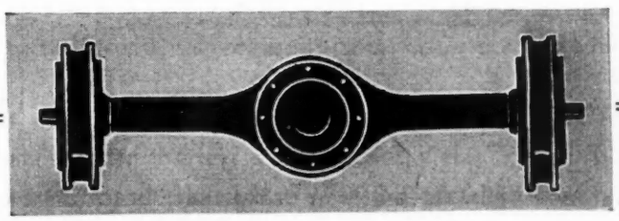
—a system of factory-approved clearances and tolerances on fits for reciprocating, oscillating and revolving elements of a vehicle.

This matter goes more than skin deep. It consists of more than simply setting standards for repair and overhaul. Indeed, it points back to the original manufacturing processes and concerns the establishment of initial manufacturing tolerances as well as the selection of a suitable tolerance system.

From the engineering point of view, wear life is a function of surface finish, surface hardness, and the maximum clearance permitted by manufacturing tolerances. Thus it is conceivable that a combination of limits in the direction of greater clearance may consume a major part of the permissible wear life of a given element before the vehicle leaves the plant. By

Where Repair Inspection Standards Might Apply on Rear Axles

Back lash, ring gear and pinion
Diametral clearance in ball bearings
End clearance in ball bearings
Differential bearing end play
Trueness of differential case diametrically and laterally
Trueness of ring gear mounted on differential case
End play in differential side gears
Back lash between differential side gears and spider pinions
Diametral clearance between side gears and differential case
Diametral clearance between differential spider gears and spider journals
End play of differential spider gears
Axle shafts should run true on centers within
Fit of axle key in hub
Side clearance between axle housing spring seats and axle housing
Diametral clearance between axle housing spring seats and axle housing
Brake drum should run true within
Minimum thickness of brake lining
Alignment of axle housing ends should be within
Eccentricity of wheel at felloe
Lateral run-out at wheel felloe
Clearance between brake drum and brake band lining



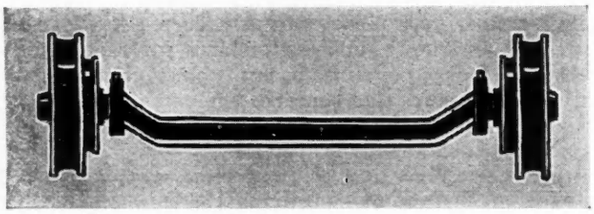
the same token on modern, well-finished parts, insufficient clearance may produce the same effect although in a more disastrous degree by causing premature failure.

Some maintenance standards we examined recently specified replacement values to a finer tolerance than those used in original manufacture. Obviously, then, a study leading to the establishment of repair inspection standards will perform the additional function of rechecking important elements from an entirely different viewpoint. In some cases it may conceivably lead to a revision of original tolerances. W. L. Hindman, writing in *Automotive Industries*, Aug. 16, 1930, probably visualized this when he said, "The control of vibration, of force feed lubrication, and the provision of proper allowance for wear are of vital importance to the automobile manufacturer. And these, inherently, are dependent upon the maximum rather than the minimum clearance of the mating parts."

One of the chief objections mentioned in connection with the publication of factory tolerances is the possibility of invidious comparison between tolerances established by one manufacturer with those of another. But is this objection valid? Good practice today runs within about the same limits, and if any serious discrepancies are found, the designer will surely be glad to correct them. At any rate, it is certainly much safer to establish an approved set of standards than have the user set up his on a much less reliable basis.

This brings us to some of the economic considerations. For example, John Younger asks, "What is the life of a transmission, of an engine, of a rear axle? We know we can have the motor reconditioned but we do not know how it affects the life of the other units. We know also that the bearings outlive the rest of the car. Are we building some units better than we should and at the same time should we not concentrate our designers' attention on the weak unit?"

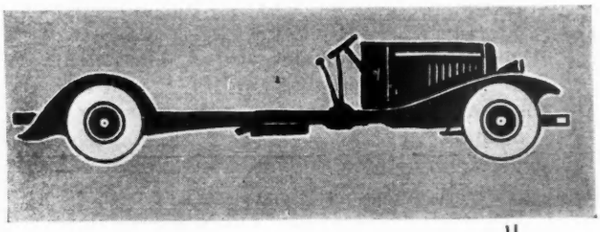
These are logical questions. There is a fairly definite economic life limit to any kind of equipment. Maintenance men recognize this by putting in less reinvestment into a car three years than they do on one



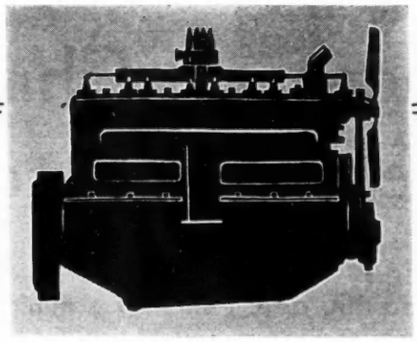
Where Repair Inspection Standards Might Apply on Front Axles

- Diametral clearance between front-axle king pin and bushings
- Diametral clearance of tie-rod bolt in bushing
- Diametral clearance between ball or roller bearing outer races and wheel hub
- Diametral clearance in ball bearings
- Eccentricity of wheel spindle which receives wheel bearings
- Clearance between cones of bearings and wheel spindle
- Eccentricity of brake drum
- Eccentricity of wheel at felloe
- Lateral run-out of wheel at felloe
- Clearance between brake drum and brake band lining
- Wheel camber
- Caster angle
- Straightness of front axle (alignment of king bolts with spring pads)

Suggested Standards for Reconditioning Chassis Parts



- Diametral clearance between spring bolt and spring eye bushings
- Diametral clearance between outside diameter of spring-bolt bushing and spring eye
- Side clearance between spring shackle, or spring bracket and spring
- Diametral clearance of clevis pins of brake system in brake clevises
- Diametral clearance of brake shafts in brake-shaft bracket bearings



Where Repair Might Apply Inspection Standards on Engines

Crankshaft Group

Crankshaft end clearance
Clearance between crankshaft bearings and journals
Concentricity of crankshaft journals
Crank-pin bearing end clearance
Center main-bearing journal must not run out more than

Cylinder Group

Cylinder bore must be straight within (maximum taper)
Concentricity of cylinder bore, round within
Concentricity of piston, round within
Piston clearance in cylinder at top per inch cylinder bore
Piston clearance in cylinder at skirt per inch cylinder bore
Variation of piston weight in ounces
Piston ring gap, per inch cylinder bore
Clearance between piston ring and piston groove
Compression pressure variation of each cylinder

Valve and Valve Mechanism Group

Valve-timing variation from indicating mark on flywheel for each valve function
Camshaft bearing and journal clearance
Camshaft bearing journals concentricity
End play in camshaft
Push-rod clearance in guide
Push-rod roller concentricity
Push-rod roller clearance on roller pin
Back lash of timing gear teeth
Valve-stem and push-rod clearance
Valve-stem clearance in valve guide
Width of valve seat
Clearance of rocker-arm bearing and journal
Concentricity of rocker-arm journal
Variation of valve-spring pressure

Miscellaneous Group

Oil-pump journal and bearing clearance
Oil-pump gears, end play
Clearance between outside diameter of pump gears and pump body
Back lash of oil pump gears
Clearance between water-pump shaft and bearings
Side play in ignition distribution shaft
Flywheel ring gear and starter gear back lash

only a year old. Is it possible that some units or some individual elements have too much useful life in comparison with the rest of the vehicle? Perhaps there is something here that may more than justify a reasonable investment in a study designed to develop maintenance standards. Along with the data on clearances at various vital points, there is a need for an answer to the following frequently occurring questions:

1. What is the permissible end play in shafts such as camshafts, crankshafts, transmission main shafts, etc.? This is of great importance in overhauling units and determining proper bearing adjustments.
2. Since cylinders are frequently rebored, what is the maximum amount of metal that can be removed before the cylinder must be scrapped?
3. What is the permissible backlash in the various gear trains?
4. Can we determine the maximum clearance between piston and cylinder wall before serious oil pumping occurs?
5. Can limits be established for out-of-round, taper, and undersize for cylindrical fits?

An important corollary to the establishment of maintenance standards will be the setting up of correct inspection procedure in the field. This would include: (a) Recommended methods; (b) adequate test equipment. There is a strong possibility that an investigation into the latter may create the need for additional lines of inspection devices necessarily less expensive than factory equipment but capable of similar measurements and a high order of precision. Suffice it to say that whether new devices will be found necessary or emphasis placed on those now on the market, the information will be of inestimable value to maintenance men.

In conclusion, the following statement by C. T. Schaefer is very pertinent:*

"It is surprising that so little study has been given to the subject, as much depends upon the decision

*The Automobile Mechanics Handbook, chapter 11, page 256.

(Turn to page 437, please)

Heat Treatment of Chromium Plate Increases Resistance to Corrosion

Subjection to 450 deg. Fahr. for a minimum period of 20 min. gives greatest durability, according to tests made at G. M. Laboratories + + + +

BY heat treating chromium-plated surfaces the resistance of such surfaces to corrosion by calcium chloride solution can be increased greatly. It was found that in certain Western sections of the country, where road surfaces are treated with calcium chloride solution to lay the dust, the chromium-plated parts of cars do not retain their finish as well as might be desired, and General Motors therefore decided to look into the matter. The remedy which was discovered as a result of the research work done was described in a paper presented to the Electrochemical Society by R. J. Wirshing of the G. M. Research Laboratory. Following are extracts from this paper on "Heat Treatment of Chromium Deposits to Increase Their Resistance to Corrosion."

While investigating the action of calcium chloride solutions on chromium deposits, we were faced with the fact that in a few isolated cases the deposits were only moderately affected by the calcium chloride, although in all other cases the chromium was badly attacked. While it was not known under what conditions these more durable plates had been made, they at least offered encouragement by indicating that the problem could be solved.

A series of tests was then undertaken in which chromium was plated on copper panels, covering the entire range of possible current density and temperature, but keeping within the "bright range" so as to cover commercial practice. These panels were then subjected to the calcium chloride spray test. This test is made in an ordinary spray cabinet, using a 20 per cent calcium chloride solution, spraying the pieces under test for 8 hr. and then allowing them to stand outside of the cabinet, without washing, for 16 hr. This constitutes one cycle.

It was noticed that the panels plated at low current densities and the highest temperatures possible for those current densities, and those plated at high temperatures with the lowest possible current densities for those temperatures, gave the best results so far as resistance to calcium chloride was concerned.

Hydrogen Alloys With the Metal

A study of these results indicated that hydrogen might be playing an important part in the character of the deposit. It is a well known fact that in the electrodeposition of metals hydrogen is usually evolved, and some of the hydrogen forms an alloy with the metal. An increase in the current density increases the content of hydrogen in the alloy, and an increase in the temperature of the plating bath tends to decrease the content of hydrogen. It is also stated in the literature that metals alloyed with hydrogen are more soluble than the pure metals themselves.

All of these facts fit in with the results obtained in our tests. It seemed then that, by a proper combination of temperature and current density, a chromium deposit could be produced that would be much more resistant to the solvent action of the calcium chloride solution. However, when plating in the "bright range" any decided rise in temperature must be accompanied by a rise in the current density, while a drop in the current density must carry with it a drop in the temperature. This made it impossible to gain full advantage of a rise in temperature or a drop in current density, since the two factors have to be controlled in such a way that they act against each other.

It was therefore necessary for us to find some means of removing the hydrogen that was alloyed with the chromium, after the piece had been removed from the plating bath. Previous work had indicated that heat might be employed to accomplish this result. Accordingly, more test pieces were prepared and some of them were subjected to heat. Both the temperature of the oven and the length of time of heating were varied.

Suitable Heat-Treating Temperatures

Both the heated and unheated test specimens were then subjected to the calcium chloride salt spray and in every case the heated panels were better than the blanks. Further experiments showed that deposits that had been heated for 30 min. at 450 deg. Fahr. (232 deg. C.) would stand seven cycles in the spray without sign of failure, while unheated specimens usually failed in one cycle. Two hundred deg. Fahr. (93 deg. C.) for 30 min. seemed to be the lower limit at which any improvement was to be gained, while any less period than 20 min. at 450 deg. Fahr. (232 deg. C.) would not give the greatest durability.

It was then thought that hydrogen present in the base metal upon which the chromium was plated might play a part in the results obtained. However, heating the panels before plating and not after, failed to produce any improvement in the resistance of the chromium to the calcium chloride solution. Heating both before and after plating was no better than heating only after plating.

(Turn to page 444, please)

JUST AMONG OURSELVES

Registration Period Effects Car Sales

PRACTICALLY all the states in the union now have some plan for reduction of registration fees at some time during the year. Nineteen of them reduce the fees 50 per cent at some time during the year, usually after July 1; ten states have two reductions, one of 50 per cent and the second of 75 per cent of the annual fee; one state reduces twice 25 per cent the first time, and 75 per cent the second time; 11 states reduce three times during the year of 25 per cent, 50 per cent and 75 per cent; six states reduce the rate on the first of each month, a proportional part of the basic rate. Ohio and the District of Columbia make no change in their rate throughout the year.

With the exception of those states which reduce the rate monthly, a material falling off of new registrations results for a period of anywhere from two or three weeks to a couple of months prior to the date on which the reduced rate becomes effective.

In those states where the rate is reduced 50 per cent, for example, on the first of July, the months of May and June are quite apt to show a material falling off in registration of new cars. Probably the ideal system is that of reducing the rate monthly.

Gadgets, Dingusses & Co. Make Carburetors and Cars

AN important technical discussion has been going on in the columns of a Detroit newspaper, news of which reached us through D. W. Candler, general manager, Holley Carburetor Co., one of the participants in the arguments. The point at issue, as we understand it from the clipping sent to us, concerns the true meaning of those well-known automotive engineering terms—"gadget" and "dingus."

This clipping quotes Mr. Candler as taking a very definite stand on the matter with the following words:

"I am in daily contact with 'gadgets' and 'dingusses,'" Mr. Candler is quoted as saying, "and have no hesitation in asserting that both of these things are 'hickeys.' The trouble is to determine whether all three always answer the same purpose. I cannot inform you as to that. My opinion is that a 'hickey' is always either a 'gadget' or a 'dingus.' But I cannot answer whether 'gadgets' and 'dingusses' are always 'hickeys.'

"I am pretty sure, however, that all three are always 'duphonys' as well as 'whatchamaycallits' and 'thingamajigs.' The only thing I am very positive about is that you can't make carburetors without all of 'em."

Nor any other part of an automobile, we might add, Mr. Candler. Many vehicle manufacturers, as you know, have entire departments devoted entirely to testing, breaking, worrying and otherwise irritating the various gadgets, doodads, dingusses and thingamajigs constantly being brought to them for examination and acceptance. These are usually called "research departments" and I have found the men in charge often object to having their scientific explorations referred to as gadget engineering. But the fact remains that the gadget engineer always has and always will play an important part in automobile design—God bless his dingusses!

Streamlining and M.P.H.

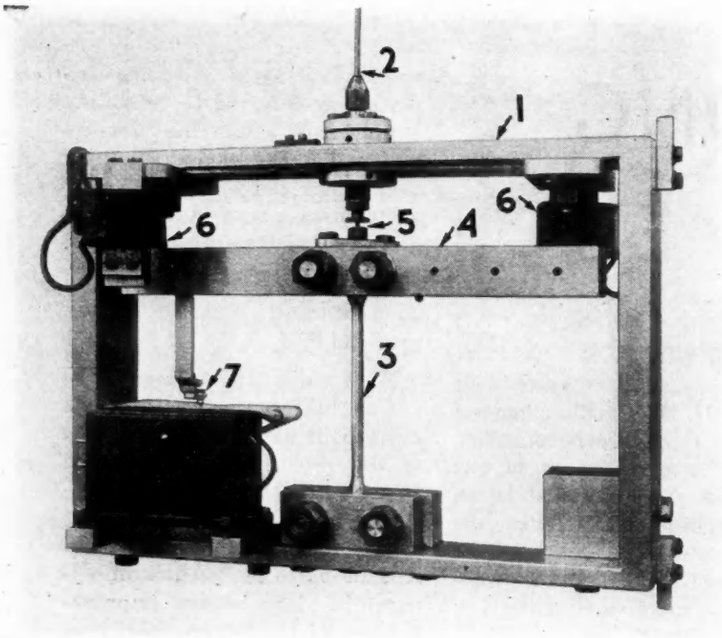
"THE car of the future will be as different from today's automobile as today's automobile is different from the covered wagon." J. Ledwinka, chief engineer of the Budd Body Co., is responsible for that statement. And he bases his prediction, apparently, largely on improvements likely to be made in streamlining of bodies.

"Today's motor car is a wonderful machine," he continues, . . . "but is far from perfect. While it is faster than ever, smoother, more luxurious and more dependable, it is still a very cumbersome vehicle and offers tremendous resistance to the wind. Until it is streamlined it will be only about one-half as efficient as it could be."

We think Mr. Ledwinka is right in this forecast. Moves in the direction of scientific streamlining will be much more apparent in stock car designs in the next two years than they have been in the last five.

D. G. Roos, Studebaker's chief engineer, gave some figures in an Indiana S.A.E. Section paper recently which show vividly the effect of streamlining at high-speed in a practical way.

The 125 hp. engine of the Studebaker President, he said, gives the sedan model a top speed of 80 m.p.h. If a 200 hp. engine were substituted, with no other change in chassis or body, the top speed would be increased to 93½ or 94 m.p.h. Substituting on the same chassis, however, with the original 125 hp. engine, a streamlined roadster body designed for low wind resistance, the car will make a top speed of 107 to 108 m.p.h.—N. G. S.

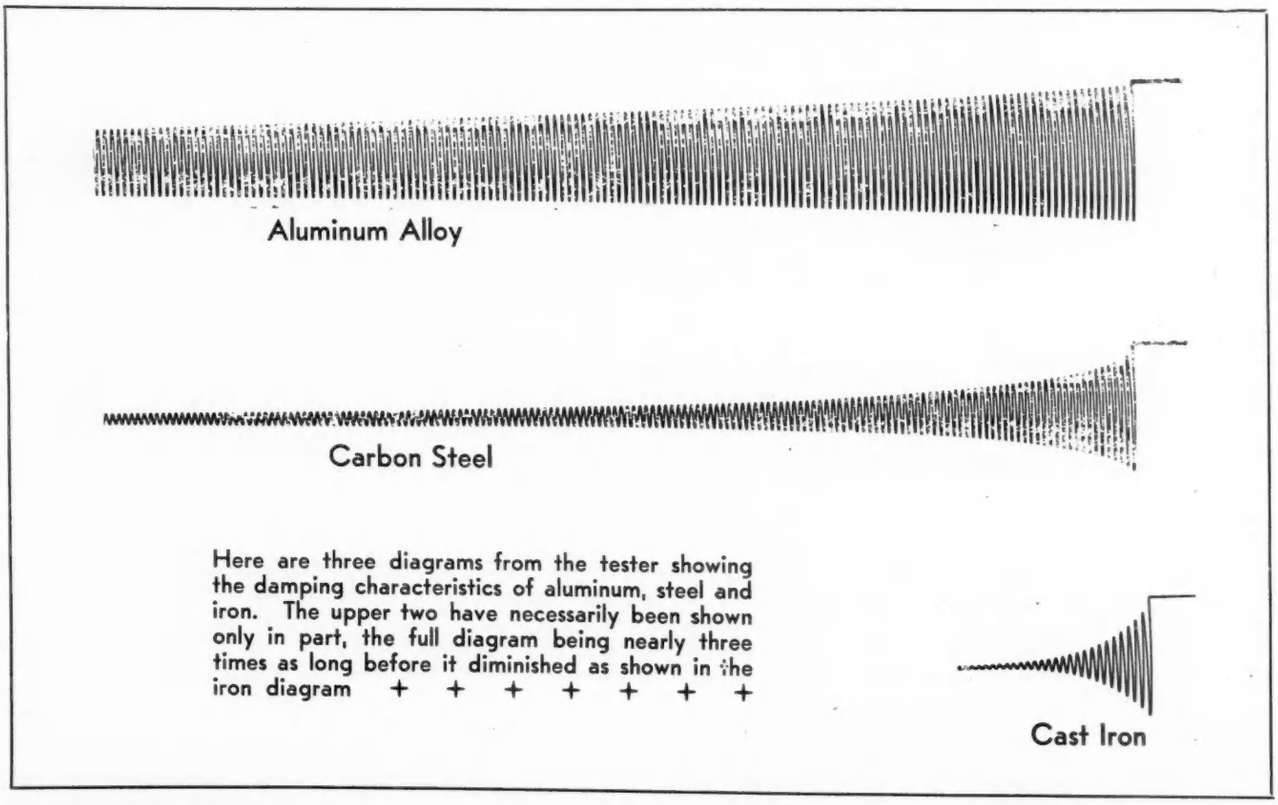


Foepple-the Damping

Method used in this instrument was developed in the Woehler Institute and is claimed to be a practical method of measuring internal friction

IN an article on damping capacity of materials which appeared in *Automotive Industries* of Aug. 22, reference was made to a machine for determining this capacity automatically. This machine, known as the Foepple-Pertz, is being handled in this country by the Testing Equipment Division of the Southwark Foundry and Machine Company, Philadelphia.

Referring to the illustrations herewith, the machine comprises a frame 1, which is hung from the ceiling by a wire 2 about 10 ft. long. This unusual method of mounting the machine helps to secure the high degree of accuracy needed in measuring the small amount of work absorbed by internal friction in the specimen 3. The test rod 3, which is rigidly clamped at its lower end in the frame 1, carries at its upper end a mass 4 which makes a reciprocating rotary movement about the axis of the test specimen, twisting same back and forth. A small pivot 5 prevents lateral



Here are three diagrams from the tester showing the damping characteristics of aluminum, steel and iron. The upper two have necessarily been shown only in part, the full diagram being nearly three times as long before it diminished as shown in the iron diagram + + + + + + +

Pertz Machine Determines Capacity of Materials

movements and assures that the stresses in the specimen are purely torsional.

The test itself is started by twisting the mass 4 any desired amount and holding it in the twisted position by means of adjustable electro-magnets 6. On breaking the electrical circuit, of which the coils of the electro-magnet form part, a free oscillation is produced. The stylograph 7 secured to the mass 4 draws a diagram of damped free vibrations on a chart which is moved by clockwork 8.

These records, of which three are produced herewith, are obtained in a few minutes and represent the damping characteristic of the material, which can be replotted in the form of a diagram showing the amount of work absorbed in relation to the stress.

The machine determines internal frictional losses of materials, which are also represented by the well-known hysteresis loop. The method, as described herein, has been developed in the Woehler Institute and is claimed to represent the most practical way of measuring the internal friction.

The internal friction is of direct importance for damping critical vibration which occur in service with crankshafts, turbine blades and other repeatedly highly stressed machine parts. A machine part with a high internal friction or damping capacity keeps the amplitudes in a range where no failure may be expected.

It may happen that a material with a high fatigue limit breaks as the resonance stresses exceed the safety range, and that a material with a lower fatigue limit but with higher internal friction damps the critical vibration to such a degree that even the lower fatigue range is not exceeded and the material does not fail.

There is, furthermore, a fundamental relation between the elastic properties as determined by the usual static test and the results of this new test. This test measures automatically the area of static stress-strain diagrams, which represent the absorbed work.

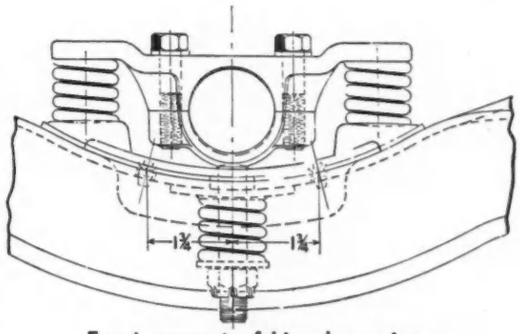
It has been found that internal friction starts at very low stresses; as a matter of fact, far below the so-called yield point.

The test is non-destructive and its result is a physical property, viz., the internal absorption of energy, due to friction or non-elastic action. This quality is not the result of local conditions, as are the breaking stresses in static and fatigue tests; but it refers to the total volume of the material as the modulus of elasticity, or Poisson's ratio do. In other words, this test represents a novel method of investigating the stress range practically used in service.

The new method also seems to hold particular promise for use in a study of internal or external stress concentrations, due to flaws or surface defects. This was shown by a number of tests recently made at Professor Foepple's laboratory.

New Mounting on Lincoln Cushions the Engine in Up and Down Directions

ENGINES on Lincoln cars are now flexibly supported at the forward end, as illustrated by the drawing herewith. The Lincoln engine is supported on the chassis frame at three points, having a trunnion support on a cross member at the forward end. The trunnion bearing, however, is not rigidly secured to the frame cross member, but supported flexibly between coiled springs. The trunnion bearing is in halves, and the upper half is provided with lugs which rest on coiled springs, so that the weight of the engine is taken by these springs. To the lower half of the bearing is secured a stud, which extends through a hole in the cross member and is surrounded by a coiled spring below that member, the spring being backed up by a nut. Thus the forward end of the engine is cushioned in both the up and down directions, and being trunnion-supported, it can also adjust itself angularly to any distortion of the frame.



Front support of Lincoln engine

Fiat Works Producing Seven-Cylinder Air-Cooled Engine for Small Planes

ALTHOUGH the Fiat Works of Turin, Italy, in the past has been producing chiefly 12-cylinder, water-cooled engines for aircraft, its line also included a small radial air-cooled type, the A-50, of 3.94-in. bore and 4.73-in. stroke (100 by 120 mm.). This has now been superseded by the A-53, which has a bore 5 mm. larger, the cylinder dimensions being 4.13 by 4.73 in., and the piston displacement (for seven cylinders) 443 cu. in. The compression ratio is 5.5 and the normal output 115 hp. at 1900 r.p.m. and 120 hp. at 2000 r.p.m. The fuel consumption is given as 0.5 lb. per hp.-hr. With propeller hub and controls the engine weighs 326 lb., which makes the specific weight 2.83 lb. per hp. A Zenith carburetor is fitted, and ignition is by a Marelli magneto, which is produced by a subsidiary of the Fiat company.

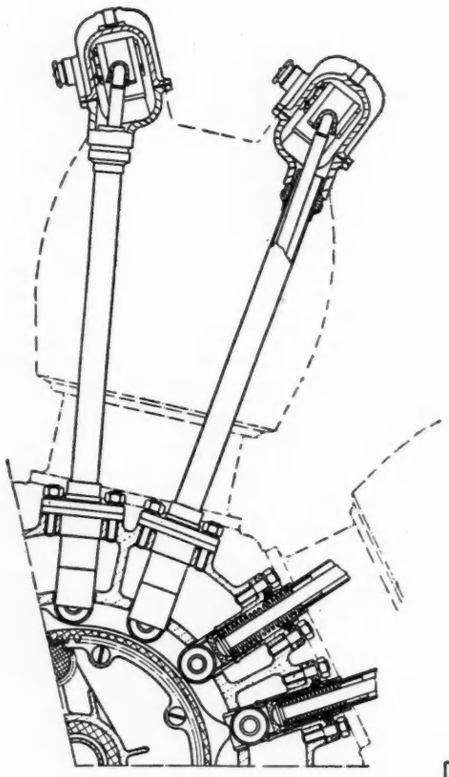
The standard method of starting consists in charging the cylinders with a combustible mixture under pressure by means of a hand pump and distributor, and then firing this charge in the cylinder or cylinders on the power stroke by a small hand magneto. Lubrication is by the dry sump system, which comprises a pressure pump and a scavenging pump.

The engine is intended primarily for two-seater touring planes, for which an output of 100-120 hp. is generally demanded. An improvement in the new engine is the inclusion in the equipment of compressed charge starting, which has been used for many years on the larger Fiat engines.

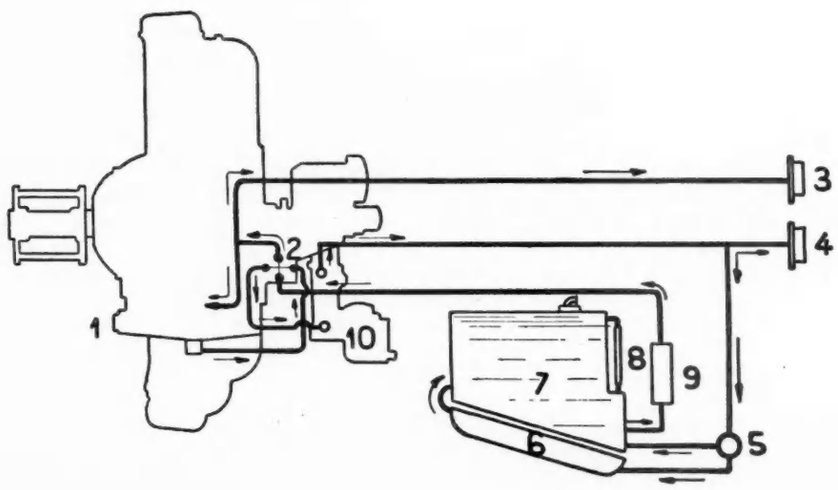
The carburetor is now heated by the oil of the lubrication system, and a diffuser is fitted which insures a more nearly homogeneous mixture to the engine and at the same time gives a slight supercharging effect. In spite of the addition of various accessories to the engine, the specific weight has been appreciably reduced as compared with that of the A-50—from 3.17 to 2.68 lb. per hp.

The crankcase, a light aluminum casting, is made in halves. The front half incloses the timing gear, and the cover carries the propeller thrust bearing. The cover of the rear half carries brackets for the magnetos, pumps, etc., while inside this half are housed the drives for these auxiliaries.

The cylinders are of forged steel with aluminum heads screwed on hot. The combustion chambers are hemispherical in form and carry two inclined valves



Above—Detail of valve gear



Right—Diagram of lubrication system: 1, oil filter; 2, pump; 3, pressure gage; 4, oil-temperature indicator; 5, three-way cock; 6, oil cooler; 7, oil tank; 8, oil-level gage; 9, filter; 10, carburetor +

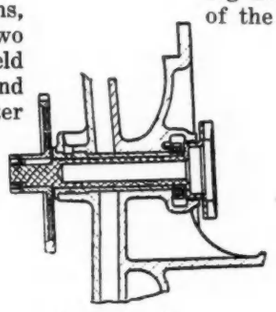
Horsepower 115-120
Displacement 443 cu. in.
Compression ratio 5.5
Weight 2.83 lb. per hp.

and two horizontally opposed spark plugs. The valve seats and guides and the spark plug seats are of bronze, pressed into place hot.

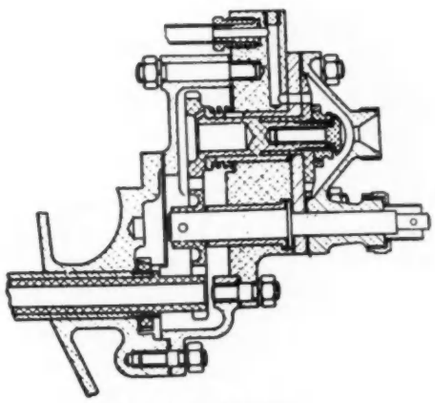
Aluminum alloy is used for the pistons, of which each has two compression and two oil scraper rings. The piston pins are held rigidly in the connecting rod small ends and work in the piston bosses. Both the master and the stem connecting rods have solid big ends, that of the master rod being anti-friction lined, while the others carry a fixed pin which oscillates in a bronze bush in the master rod.

The crankshaft is in two parts, joined at the crankpin by splines. On the back end of the shaft is the pinion driving the auxiliaries, and on the other end the pinion driving the valve gear. This latter pinion forms a shoulder for the rotating satellite wheel bracket of the planetary valve actuating gears. The crankshaft runs on three bearings; two anti-friction lined are close alongside the crank, while the third bearing outside the timing drive is of the deep groove ball type and takes the thrust of the propeller in both directions.

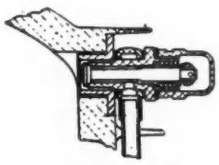
Dual ignition by two independent Marelli (MF-7) magnetos is fitted. The maximum spark advance on each magneto is 34 deg., 16 deg. fixed and the remaining 18 deg. variable by hand. The overall diameter of the engine is 36 in.



Magneto drive



Starting distributor



Starting valve

Section through cylinder of Fiat 120 hp. radial engine + +

Aeronautical Data is Available

THE following Technical Reports, Technical Notes, Technical Memorandums, and Aircraft Circulars have been listed by the Office of Aeronautical Intelligence of the National Advisory Committee for Aeronautics during August, 1931. Copies of these publications may be obtained from the above office upon application. The distribution of these publications is necessarily limited, hence it will be appreciated if requests are made for copies only of such as contain material of interest to those interested in the problems involved.

Technical Reports

No.

T.R. 382 Elastic Instability of Members Having Sections Common in Aircraft Construction.
By George W. Trayer and H. W. March.

T.R. 383 On the Theory of Wing Sections with Particular Reference to the Lift Distribution.
By Theodore Theodorsen.

T.R. 386 Maneuverability Investigation of an F6C-4 Fighting Airplane.
By C. H. Dearborn and H. W. Kirschbaum.

T.R. 390 The Effect of Valve Timing upon the Performance of a Supercharged Engine at Altitude and an Unsupercharged Engine at Sea Level.
By Oscar W. Schey and Arnold E. Biermann.

T.R. 392 Reduction of Turbulence in Wind Tunnels.
By Hugh L. Dryden.

Technical Notes

No.

T.N. 386 Effect of Nose Shape on the Characteristics of Symmetrical Airfoils.
By Robert M. Pinkerton.

T.N. 387 The Pressure Distribution Over a Modified Elliptical Wing Tip on a Biplane in Flight.
By Richard V. Rhode and Eugene E. Lundquist.

T.N. 388 A Comparison of the Aerodynamic Characteristics of Three Normal and Three Reflected Airfoils in the Variable Density Wind Tunnel.
By George L. Defoe.

Technical Memorandums

No.

T.M. 632 Downwash Measurements Behind Wings with Detached Flow.
By E. Petersohn.
From Zeitschrift für Flugtechnik und Motorluftschiffahrt, May 28, 1931.

T.M. 633 Effect of Viscosity in Speed Measurements with Double-Throat Venturi Tubes.
By H. Peters.
From Zeitschrift für Flugtechnik und Motorluftschiffahrt, June 15, 1931.

T.M. 634 Experiments with a Wing from Which the Boundary Layer is Removed by Suction.
By Oskar Schrenk.
From Zeitschrift für Flugtechnik und Motorluftschiffahrt, May 15, 1931.

T.M. 635 The Use of Slots for Increasing the Lift of Airplane Wings.
By Fr. Haus.
From L'Aeronautique, June, 1931.

Aircraft Circulars

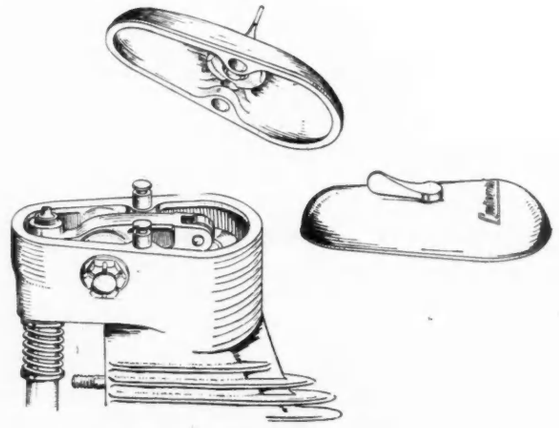
No.

A.C. 149 Breguet 390 T Commercial Airplane (French). A Ten-Seat All-Steel Sesquiplane.
From L'Aeronautique, Dec., 1930, and Les Ailes, April 23, 1931.

A.C. 150 The Avro 627 "Mailplane" (English). A Single-Seat Biplane.
From Flight, Aug. 14, 1931, and The Aeroplane, Aug. 12, 1931.

Continental Quick-Detachable Rocker-Box Cover

A FEATURE of the second series Continental Model A70 seven-cylinder aircraft engine is a new leverlock rocker box cover, which is removed or replaced by the simple operation of turning a small lever 90 deg. from the locked position. This lever, located on top of the cover, actuates a flat spring-steel cam which engages with slots in two pins fixed in the cylinder head.



Continental cam-locked rocker-box cover

This mechanism eliminates the use of screws and safety wires. It is self-locking and the cover is said to be absolutely grease-tight. The time ordinarily consumed in taking off rocker-box covers and reassembling them when checking valves, is cut in half by the use of this new device.

Turntables in Floor Type Roller Conveyer System Facilitate Handling

Such elements as the assembly lift and frog section make the conveyer equipment at the Pennsylvania Pump Co. of interest to automotive manufacturers

DETAILS of a floor type roller conveyor recently installed at the plant of the Pennsylvania Pump Co., Pittsburgh, Pa., are given in a report made by A. M. Kerr, engineer, Mathews Conveyor Co., makers of the conveyor equipment. Some of the elements, such as turntables and the assembly lift, are of great interest to many automotive manufacturers. Here is Mr. Kerr's description of this interesting production line: The whole system is set at floor level and runs in a U-shape down one side of the assembly building and back on the other side. At the start of the conveyer line there's an air lift sunk in a pit and having a roller conveyor section as its top, shown coming up at the left of Fig. 1. It stops at about waist-high level and a workman places on the rollers a large casting which is the base of a pump. Here are fastened the vertical side pieces of the pump, then by means of a foot pedal the hoist is released. At its lowest point the hoist align its own rollers with those of the assembly line, and the structure of the pump is moved off.

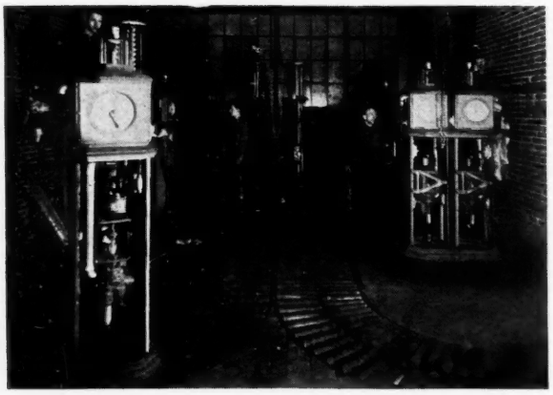
Every few feet along the assembly line there is a roller conveyor turntable upon which some assembly operation is carried out. A pump moves onto a turntable which is lined up with the fixed conveyer. Then by means of a foot pedal the operator at the assembly station releases the lock and turns the table into the position which makes it most easy for him to work upon the pump.

At the end of the assembly line, the pumps continue on the conveyer to the inspection department. Here a roller conveyer frog section is fixed into the main line so that any defective assemblies can be quickly shunted. off. This feature is unusually effective, as it eliminates any need of holding up production while rejects are removed from the line.

Now the conveyer carries the pumps on to the testing floor (Fig. 2), where, by means of special testing euipment, the pumping capacity of each unit is measured. This test must show each pump capable of a predetermined number of gallons per minute.

Further down the conveyor line the pumps receive first a flat coat of paint and then proceed to the spray paint booths, where the finishing coat is applied. The spray paint booths are equipped with roller conveyer turntables, as shown in Fig. 3, which are similar to those in the assembly line. These permit the spray

Gasoline pumps are assembled on this U-shaped roller-conveyor, equipped with turntables at each assembly station + +



(Left) The testing floor in the Pennsylvania Pump Co. plant where pumps are handled on roller conveyers + + + + + + + +

(Below) The paint spray booths are served by roller conveyors + + + + + + + +

paint operators to rotate the pumps as they paint them, handy foot pedals making it possible for them to hold the table in any position.

Definitions of Tire Terms

The following definitions of terms used in the tire industry, which are being circulated by the Better Business Bureau of New York, have been approved by tire manufacturers and distributors representing a majority of the production of the industry.

1. A "Ply"

A ply is one of a number of layers of rubberized cotton fabric, either cord or square woven, extending from bead to bead and forming the body of the tire.

2. A "Breaker Strip"

A breaker strip is a layer or layers of rubberized fabric or cords extending around the tire directly over the body plies and under the tread. It is approximately the width of the tread and serves to promote adhesion between the tread and the carcass, and to help absorb and distribute road shocks.

3. In Enumerating the Number of Plies, Breaker Strips Should Be Excluded

Breaker strips should not be enumerated as plies because they are different in character and perform different functions.

Breaker strips usually have a lower cord count to the inch and consequently are not as strong as plies. Breaker strips do not extend to the bead of the tire as the plies do. Breaker strips do not, therefore, contribute materially to the bursting resistance of a tire, which is the main function of the plies.

4. A "First Line" Tire

A first line tire of any one manufacturer or distributor is that manufacturer's or distributor's best standard size 4 or 6-ply brand. It carries the manufacturer's or distributor's name and/or identification and guarantee. It is lower in price than so-called "super" tires of the same brand or line. Similarly, it is higher in price than the manufacturer's or distributor's tires known to the trade as "second" and "third" line tires. Although each manufacturer's or distributor's first line tire may represent his best standard size 4 or 6-ply tire, there is not necessarily any equality of competitive first line tires as to materials, workmanship or price.

5. A "Second Line" Tire

A second line tire is a brand of tire inferior in quality and lower in price than the corresponding size first line tire of the same manufacture.

6. A "Third Line" Tire

A third line tire is a brand of tire inferior in quality and lower in price than the corresponding size second line tire of the same manufacture.

7. Recommended Procedure for the Use of the Manufacturer's or Distributor's Name in the National and Retail Advertising of Second and Third Line Tires

Whenever tires are advertised, the manufacturer's or distributor's name may be included, but not in such a way as to suggest that prices quoted for one grade, brand or design of tire apply to another.

8. A "Heavy Duty" Tire

A heavy duty tire of any specific brand, grade or line is a tire of more than 4 plies having more or better material and greater weight than the same rim size 4-ply tire of that grade, brand or design. "Second line" heavy duty tires are inferior in quality and lower in price than the same size "first line" tires of the same manufacture.

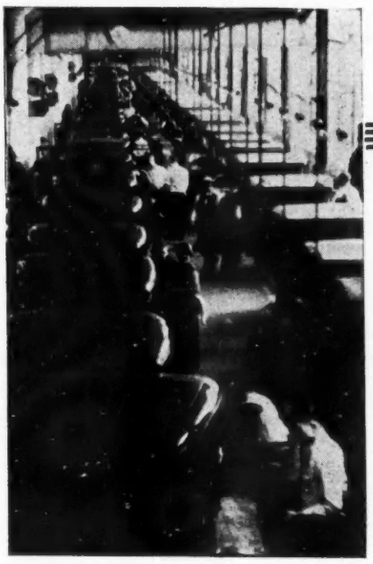
9. A "Super-Heavy Duty" Tire

A super-heavy duty tire is a term used by certain manufacturers to designate a tire having more and/or better material, greater weight and greater size than the same rim size heavy duty tire of the same grade, brand or design.

10. The "Bead" of a Tire

The bead of a tire is that portion of a tire engaging the rim on which it is mounted.

PRODUCTION LINES



Remember the Dates

Mark October 7 and 8 on your calendar. That's the Annual SAE Production Meeting. You can't afford to miss it. It will give you the latest information on welding, hot coining, metal cleaning, inventory control, and permanent mold casting. But one of the biggest surprises is in store at the dinner. A Westinghouse scientist will make little electrons work and play for you. Don't miss this show.

Vetoes Dust and Fumes

In the plant of the U. S. Chain & Forging Co., McKees Rocks, Pa., certain operations connected with finishing and polishing of McKay bumpers, involving over 100 emery wheels, created a dust condition that often became so serious that operators were forced to stop work until the air cleared. An old-style blower system was in operation, but it could not meet the requirements.

Kirk & Blum engineers studied the condition and installed a system with special hoods and streamline fittings. Frank A. Bond, V. P. of the U. S. Chain & Forging Co., reported that this blower system solved their dust problem entirely; it protects the health of the workmen, and insures steady production. Another K & B system removes acid fumes from chromium plating tanks for this company.

Extra Service

To establish closer relations with the engineering and production divisions of their customers' organizations, the Kent-Owens Co. has started a special service department. Here is a remarkable opportunity to coordinate the efforts of buyer and seller to the best advantage of both. One of the features of this set-up will be the prompt introduction of new machines into the regular production scheme. Good service certainly deserves good business.

Watch for It

October 17 is the date. Watch for this year's Production Issue of *Automotive Industries*. We mustn't let the cat out of the bag. But—it will have a definite message for every production man. Two of the hottest machine shop practice surveys of the year. A handbook of new manufacturing equipment is a valuable feature. 'Nuff sed. Just make sure of your copy.

Evidence of Stability

There are surveys and there are surveys. Dodge Bros. made one recently that throws a new light on stability of employment in the auto industry. They found that over 2300 people have been in their employ 10 years or more. Surely a refreshing bit of statistics. Must be a mighty good place to work in.

Is the Reverse True?

Wages and prices as factors in economic recovery were discussed by Edward A. Filene, Boston merchant, at the first World Social Economic Congress at Amsterdam. His central idea is the principle of higher wages and lower prices, to be achieved through scientific MASS production and MASS distribution. Mr. Filene says in part: "Wages, which mean buying power, should in every industry be raised as high as is possible without increasing the cost of the product. We might go still further and express the formula in this way: Wages should be as high as they can be made, provided the rise in wages decreases the cost of the product. That this formula is practical is shown by innumerable instances of success in business."

But isn't it true that where wages have been increased due to increased productivity, a certain proportion of employees have been displaced? This is a common corollary of introducing wage incentives or labor-saving equipment. Unless new sources of economy are discovered in the production process or in distribution there will continue to be a rather definite balance between the total amount of wages paid and the selling price.

Simple Recipe

Greasy and oily floors may be readily cleaned by the following process. Sprinkle air-slaked lime over the floor so as to cover it to a depth of about one-quarter inch. Leave it on for two or three hours. Then remove with a stiff brush. It will be found that the lime has absorbed the grease and oil. And the floor will present a surprisingly clean appearance. Pulverized feldspar will also minimize slipping hazards. —*From National Safety Council News-Letter.*

Electric Treatment

Some interesting electric and fuel furnaces of various types recently were installed in steel plants by the Electric Furnace Co. Details of these installations will be found in a new folder just off the press. Ask for "Furnaces for the Steel Industry."

Cold Facts

Manufacturing tolerances and other usable facts about cold finished bars are found in Bulletin A, just put out by Joseph T. Ryerson & Son, Inc. Gives a lot of dope of interest to production men and purchasing agents. List of products runs from shafting to special accuracy stock.—J.G.

MANUFACTURING MANAGEMENT METALLURGY

Agile Fours of 10 to 20 hp. Open New Industrial Engine Field for Waukesha

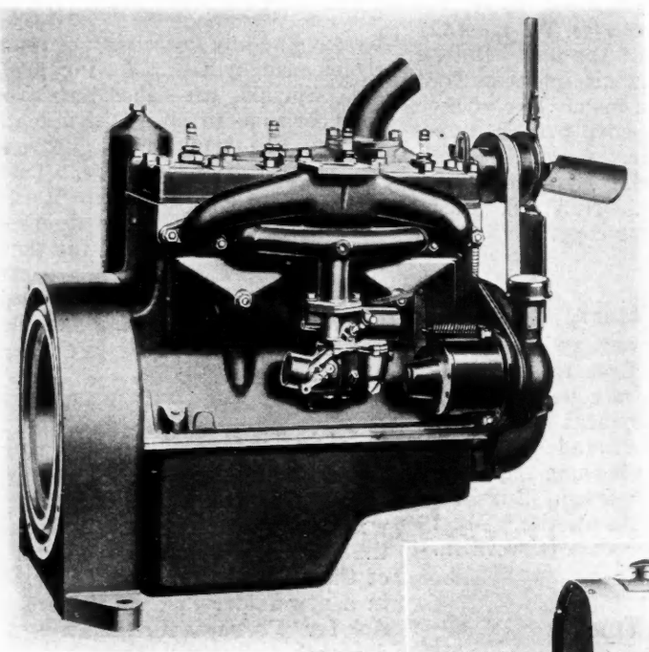
THE Waukesha Motor Co., Waukesha, Wis., has entered a new section of the industrial engine market by the manufacture of two small four-cylinder engines of 10-20 hp. size. These are known as the Agile Fours, or as Models FLJ and FKJ.

These small engines are similar in design to the larger models of the Waukesha company. They have a Ricardo combustion chamber, a short, stiff crankshaft supported by three bronze-backed, replaceable bearings; full-pressure lubrication, a built-in governor and a detachable flywheel housing. Exceptional facilities are provided for the mounting of accessories. It is possible to install a series-type oil filter, an electric starting and lighting system, a three-point mounting, and either battery or magneto ignition.

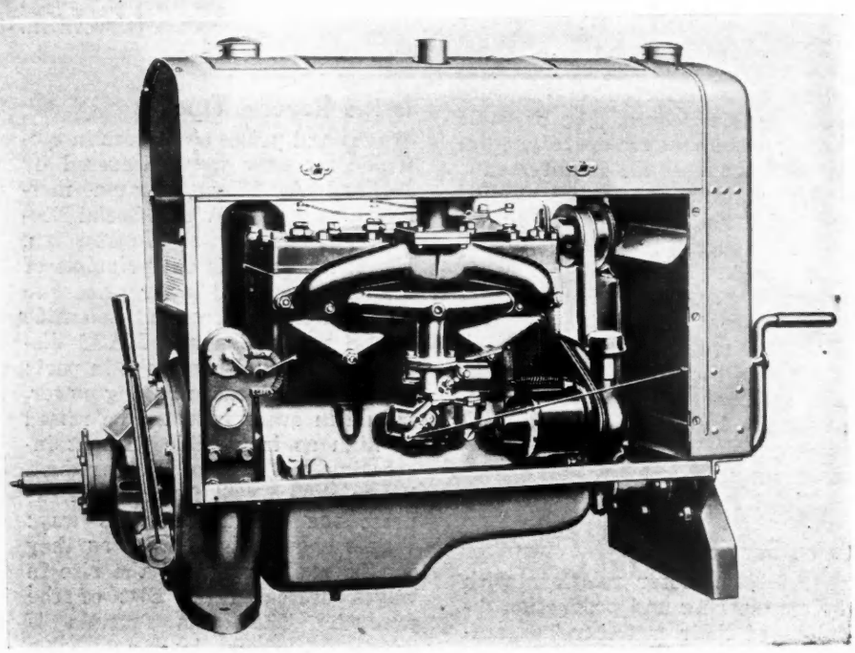
It is said to be quite rare to find a full-pressure oiling system with drilled crankshaft and outside pressure adjustment on such small engines. The oil is circulated by a positively-driven gear pump submerged in the oil reservoir and surrounded by the Waukesha oil-level equalizer.

We are informed that quite a number of these engines already have been delivered, the principal applications being to plaster and concrete mixers, golf course rollers and high-pressure sprayers.

A self-contained power unit also can be had. It is bolted to a pair of 4 by 4-in. skids and can be carried about the same as an electric motor. The power take-off is completely enclosed, while the rest of the unit is protected from the weather by a substantial sheet-metal house.



(Above) The New Waukesha Agile Four for automotive and industrial drives +



(Right) The new Waukesha Industrial Unit + + +

Section of Motor Co.

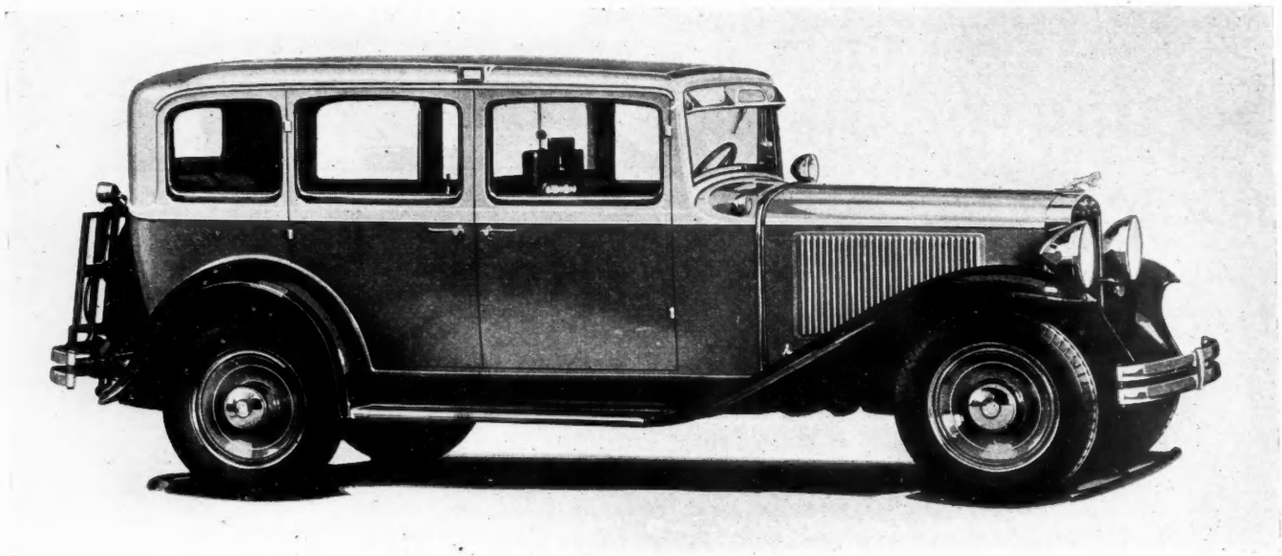
Specifications of the Agile Fours

Bore and stroke	3 x 4	3 1/4 x 4
Piston displacement, cu. in.	113	133
Valve diameter, clearance	1 3/16	1 3/16
Connecting rod bearing	1 3/4 x 1 1/4	1 3/4 x 1 1/4
Front main bearing	2 1/8 x 1 1/4	2 1/8 x 1 1/4
Center main bearing	2 1/8 x 1 1/2	2 1/8 x 1 1/2
Rear main bearing	2 1/8 x 1 1/2	2 1/8 x 1 1/2
Piston pin, floating	7/8 x 2 3/8	7/8 x 2 3/8
Connecting rod, length, cc.	7 1/4	7 1/4
Timing gears, face	7/8	7/8
Carburetor flange, S.A.E.	7/8	7/8
Flywheel diameter	11 1/4	11 1/4
Flywheel housing, S.A.E. No.	5	5
Lower water connections, diameter	2	2
Top water connections	To suit	To suit
Fan diameter (extra equipment)	16	16
Approximate weight, lb.	285	290

New Spring Suspension System for Trucks Lowers the Center of Gravity on Turns

A NEW system of spring suspension for trucks, buses and passenger cars has been invented by A. F. Hickman of the Truck Equipment Co., Inc., of Buffalo, and will be marketed by that company. It consists of a double shackle, a shaft extending across the frame, mounted in spherical bearings under the side rails of the frame and carrying at each end an arm to which the rear end of the half-elliptic spring on that side of the truck is connected by shackle, a lever arm secured to the shaft between its bearings and a coiled tension spring extending from this lever arm to a cross-member of the frame. An assembly of this type is connected to both the front and the rear springs at their rear end. It will be understood that any shock to the rear wheels will not only compress the half-elliptic springs but will also extend the tension spring, which allows the truck frame to drop more than it would if suspended on the half-elliptic springs directly. It is claimed, moreover, that in making a turn the center of gravity is dropped and the load remains on an even keel.

T.-E. gravity spring suspension



Dodge De Luxe Taxicab Designed Comfort and Municipal Police

This interior view of the Dodge Taxicab shows the Pullman auxiliary seats + +

THE new Dodge de luxe taxicab is designed in strict accordance with the standards and regulations set up by the New York police department. In addition to retaining the basic fundamentals of last year's offering—four-wheel hydraulic brakes, shatterproof plate glass, monopiece steel body—it has Pullman seats, longer wheelbase, double-drop, box-center frame, heavier rear axle, quicker acceleration, more passenger comfort and heavy-duty, easy-shift constant-mesh transmission, with silent second gear.

Double-drop box-center type of frame construction lowers the overall height of the vehicle 4 in. without any decrease in interior headroom. Furthermore, the double-drop frame permits a lower center of gravity, and it is claimed that the new Dodge cab can be tilted to an angle of 47 deg. before it will topple over. This type of frame construction is said to contribute to the vehicle a new ease of handling and increased roadability.

The heavier rear axle and the new heavy-duty easy shift transmission with silent second gear contribute to the rugged, smooth performance. Present-day traffic congestion demands an almost continual use of intermediate gear, and the silent second, as quiet in operation and as smooth as the high gear, adds comfort and freedom from nervous strain to the driver.

The use of Pullman auxiliary seats is made possible by a wheelbase of 118¼ in. A recess in the rear of the partition allows ample toe room. These seats are comfortably padded and durably upholstered.

The passenger compartment, done in genuine, tan-colored leather, is restfully simple and practical in

appearance. The wide doors are swung on wear-resisting hinges, with the rear seat large enough to accommodate three adult people. Leather-covered sponge-rubber arm rests add to passenger comfort.

Features that contribute to passenger comfort and convenience are: A built-in heater, ash receivers that chute their contents outside the body underneath the fenders; strong, chromium-plated assist handles at each side of rear seat and in front of Pullman seats; push-button driver signal system, and a heavy, sanitary rubber floor covering. The dome light is automatic and works with the opening of either door of the passenger compartment. It can be turned on when the door is closed by a switch located on the right-hand door pillar.

Cruising lights are built integrally in the roof side panel at the center pillar. Telltale lights, so connected that they will function only when the meter flag is in the recording position, are built into each side of the visor, which also contains the "vacant" sign at the front. Operating instruments—speedometer, oil gage, ammeter, heat indicator and gasoline gage—are conveniently grouped on the dash and indirectly lighted. The partition separating the driver and passenger compartments is straight and built integrally with the body. The stationary partition glass is in two sliding sections.

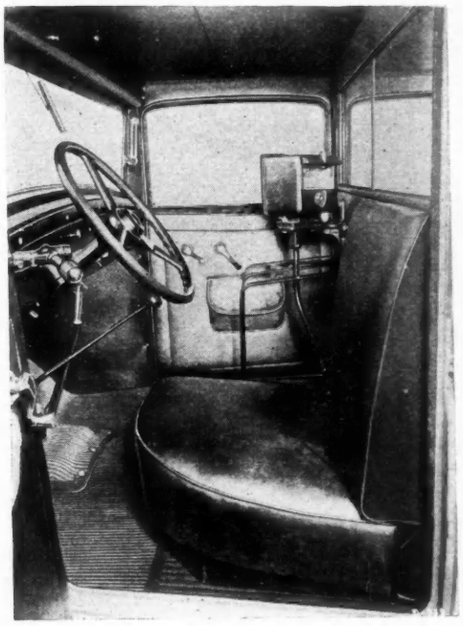
Provision is made to use any type of recording meter, and the floor is covered with an extra-heavy molded rubber mat. An opening with cover permits easy access for inspection of meter seal. Space is provided under the driver's seat for all tools except the jack handle, which is carried on the dash just under the cowl.

The driver's license and rate card case is mounted in the partition just in front of the right-hand auxiliary seat and indirectly lighted with two bulbs. The cover frame is hinged for ready access to the license and rate card from the driver's compartment.

Chrome-plated, heavy malleable iron are provided both front and rear. The trunk rack is mounted on exceptionally heavy malleable iron brackets. Two cowl ventilators insure ample circulation of air in the driver's compartment.

The Dodge L-head, six-cylinder engine comprises the powerplant. Seventy-four horsepower is developed at 3400 r.p.m. The disk wheels are demountable and 18 in. in diameter. Tires front and rear are 5.50/18, six-ply, heavy-duty balloons. The overall length is only 185 in., economizing street space.

for Passenger Requirements



The driver's compartment of the Dodge Taxicab is spacious and has two cowl ventilators. Provision is made to use any type of meter + + +

Junk It? Search Me!

(Continued from page 423)

which is left to the mechanic's judgment. The factors involved include deciding whether the use of a worn part will merely decrease the efficiency of the unit, create abnormal noise, cause complete failure at no distant date, the proportionate cost of labor in reconditioning to the cost of labor and material in replacement; whether the general condition of the car is such that its market value and the service it is still capable of rendering will warrant the expenditure necessary in either case—reconditioning or replacement—as the success of maintenance service is largely a matter of minimum cost to the owner."

The initial step in setting up the standards would be the establishment of an engineering committee by each manufacturer in cooperation with his service organization. And there is no use denying that there will be a lot of labor attached to getting the standards prepared in usable form. Probably at the outset there will be considerable differences of opinion and lack of unanimity in the standards set by different manufacturers in the same field. But then no one expects to see a single standard covering all makes of vehicles for all types of service.

Looking ahead a bit, isn't it possible that some time in the future when standards have been established by a number of manufacturers, an S.A.E. committee may get together in an effort to collate and rationalize these various standards?

Haven't we already reached that stage in the matter of truck rating?

Weiss Designs Universal Joints With Variable Radii Grooves

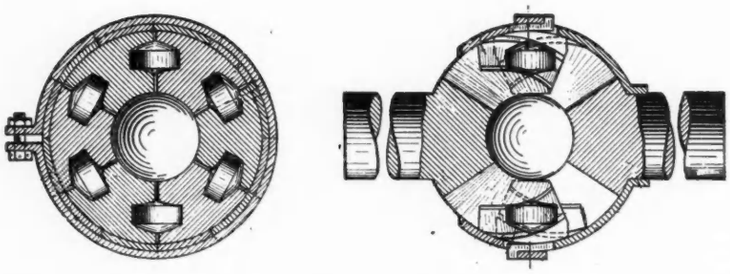


Fig. 1—Weiss uniform-transmission universal joint with rollers between driving and driven member for increased wear resistance + + + + + + + +

A NUMBER of improvements in universal joints have been made recently by Carl W. Weiss of the Weiss Engineering Co., New York. It is generally known that in the Weiss joint, which possesses the characteristic of transmitting motion uniformly regardless of the angle between the connected shafts, grooves are formed in the opposing surfaces of the prongs of the driving and driven member, and steel balls are located between these prongs at a point where the longitudinal axes of the grooves intersect.

In the development of these joints and of manufacturing processes therefor, it was found that machining of grooves of circular cross section is quite difficult and expensive. It is necessary to use spherical or ball-end cutters, and as the diameter of the cutter must be slightly greater than that of the balls to be used in the joint, and such cutters wear down quite rapidly, the cutter must be renewed quite frequently, in order that the proper diameter of the groove may be maintained in mass production. Moreover, because each ball bears in the groove at a point only, at least theoretically, all parts had to be made heavier than would have been necessary if the separating bodies had line bearing instead of point bearing.

To overcome these objections, the bottoms of the grooves in the sides of the prongs are made flat, and rollers are interposed between the prongs, as shown in Fig. 1. The side walls of the grooves and the ends of the rollers are so shaped that the latter are properly guided. The axes of the rollers always remain in the plane bisecting the angle between connected shafts, and the property of uniform transmission of motion is therefore retained.

Another improvement in the design of the joint has for its object a reduction in the wear on the balls and grooves. As originally made, the longitudinal axes of the intersecting grooves containing one ball were struck from centers located on the axes of the driving and driven members, at some distance from the point around which the two members swing. With this construction the angle of intersection of the grooves is at a maximum when the two members are in line, and the wear on the balls and on the surfaces of the grooves is then also a maximum. When the maximum angularity of the joint members does not exceed 15 deg., as in a rear-axle propeller shaft, the wear can be kept within very reasonable limits, but when provision for angularities of 35 and even 40 deg. must be made, as in front-wheel drives, the angle of intersection of the grooves or races must also be increased for the extreme positions of the balls in the races. For an angularity of 40 deg., for instance, this angle will be 54 deg.

When the members of such a joint are nearly in alignment, as they are probably during 90 per cent of the time in a front-wheel-drive car, so great an angle of intersection is unnecessary. To this end, in a new design, the longitudinal axes of the grooves are struck from different centers with varying radii, so that the large angle of the grooves necessary for operation at large angularity of the joint members is obtained without being accompanied by rapid wear on the balls and grooves when the joint is being worked at small angularity. Illustrated by Fig. 2.

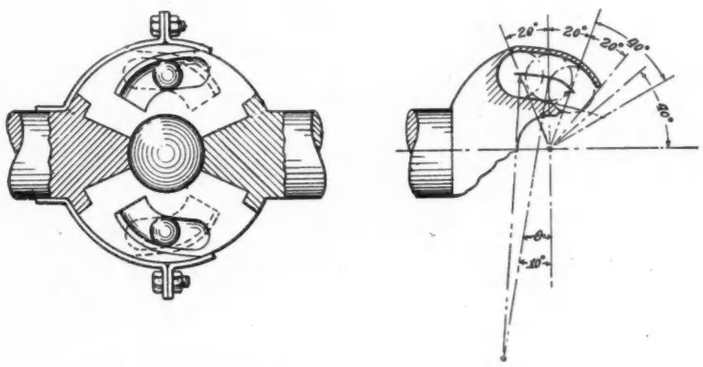


Fig. 2—Weiss universal joints with ball grooves of variable radii, to reduce wear when operating at small angles + + + + + + + + +

Fuel Survey Shows 87 Per Cent of Samples Meet U. S. Specifications

A TWO-PART report on its twenty-third semi-annual motor-gasoline survey, which was made in March last, has just been published by the U. S. Bureau of Mines (Reports of Investigations, Nos. 3129 and 3142). A total of 312 samples were collected from service-station pumps in 20 different cities throughout the country, of which 207 were competitive-price gasolines and 105 premium-price motor fuels.

The difference between summer-grade and winter-grade of motor fuels is found by comparing the Reid vapor pressure of the samples obtained in this survey with those obtained in the twenty-second semi-annual survey (August, 1930). The vapor pressure determinations were made in duplicate and the results given are the average of two determinations that did not differ by more than 0.2 lb. p. sq. in. In taking the samples, precautions were taken to reduce the loss of volatile material. Vapor pressures in the twenty-third survey range from 4.1 to 13.5 lb. p. sq. in., the average for the 207 samples of competitive-price gasolines being 9.1 lb. p. sq. in., as compared with 7.2 lb. p. sq. in. in the twenty-second survey. The average of the 105 samples of premium-price motor fuels was 8.5 lb. p. sq. in., as compared with 7.0 lb. p. sq. in. in the previous survey. The increases in the averages and in the maxima are thought to be the result of seasonal variations. The great majority of the samples in the latest survey had vapor pressures between 6.6 and 11.5 lb. p. sq. in.

Tests Included Competitive Price and Premium Gasolines

In the twenty-second survey the temperature at which 10 per cent of the gasoline was evaporated in the distillation ranged from 118 to 163 deg. Fahr., while in the present survey the range was from 88 to 160 deg. Fahr. However, in the twenty-second survey approximately two-thirds of the samples had "10 per cent evaporated" temperatures between the limits of 130 and 150 deg. Fahr., and in the present survey approximately two-thirds of the samples were between 125 and 145 deg. Fahr.

The results of this survey are not strictly comparable with results obtained in the twenty-first survey which was made in January, 1930, for two reasons: (1) In the twenty-first and preceding surveys, no distinction was made between "competitive-price gasolines" and "premium-price motor fuels" and therefore the averages of the twenty-first survey are not comparable with those of the present survey, which contained a larger proportion of "premium-price motor fuels"; (2) the two determinations that are now considered to be the most important in judging the quality of a motor fuel were not made in the twenty-first survey; namely, Reid vapor pressure and the temperature at which 10 per cent of the fuel is evaporated in the distillation.

The following are quotations from a revised specification for U. S. Government motor gasoline, which was promulgated by the Federal Specification Board on July 21, and which will become mandatory after Oct. 21:

F-4. Corrosion Test—Method 530.22. A clean copper strip shall not show more than extremely slight discoloration when submerged in the gasoline for 3 hours at 122 deg. Fahr.

F-5. Distillation Range—Method *a*. When the thermometer reads 75 deg. C. (167 deg. Fahr.) not less than 10 per cent shall be evaporated.

When the thermometer reads 140 deg. C. (284 deg. Fahr.) not less than 50 per cent shall be evaporated.

When the thermometer reads 200 deg. C. (392 deg. Fahr.) not less than 90 per cent shall be evaporated.

The residue shall not exceed 2 per cent.

Per cent evaporated shall be found by adding the distillation loss to the amount collected in the receiver at each specification temperature.

(a) The method and procedure to be used in making the distillation test is described in Method D86-30 of the American Society for Testing Materials.

The government reserves the right to reject material during the months of December, January, February and March in localities where the normal mean minimum temperature during the month of January is less than 27 deg. Fahr. if when the thermometer reads 65 deg. C. (149 deg. Fahr.) less than 10 per cent shall be evaporated.

F-6. Sulphur—Method *b*. Sulphur shall not exceed 0.10 per cent.

(b) The method and procedure to be used in making the sulphur determination is described in Method D90-30T of the American Society for Testing Materials.

F-7. Vapor Pressure—Method *c*. The vapor pressure at 37.8 deg. C. (100 deg. Fahr.) shall not exceed 12 lb. p. sq. in.

(c) The method and procedure to be used in making the vapor pressure test is described in Method D323-30T of the American Society for Testing Materials.

The government reserves the right to reject material (a) in localities where the normal mean minimum temperature during the month of January is greater than 27 deg. Fahr. if the vapor pressure at 37.8 deg. C. (100 deg. Fahr.) exceeds 10 lb. p. sq. in.; (b) during the months of June, July and August and September if the vapor pressure at 37.8 deg. C. (100 deg. Fahr.) exceeds 8 lb. p. sq. in.

A comparison of the results of the twenty-third semi-annual survey with these specifications is discussed in the following excerpts from the report.

(Turn to page 441, please)

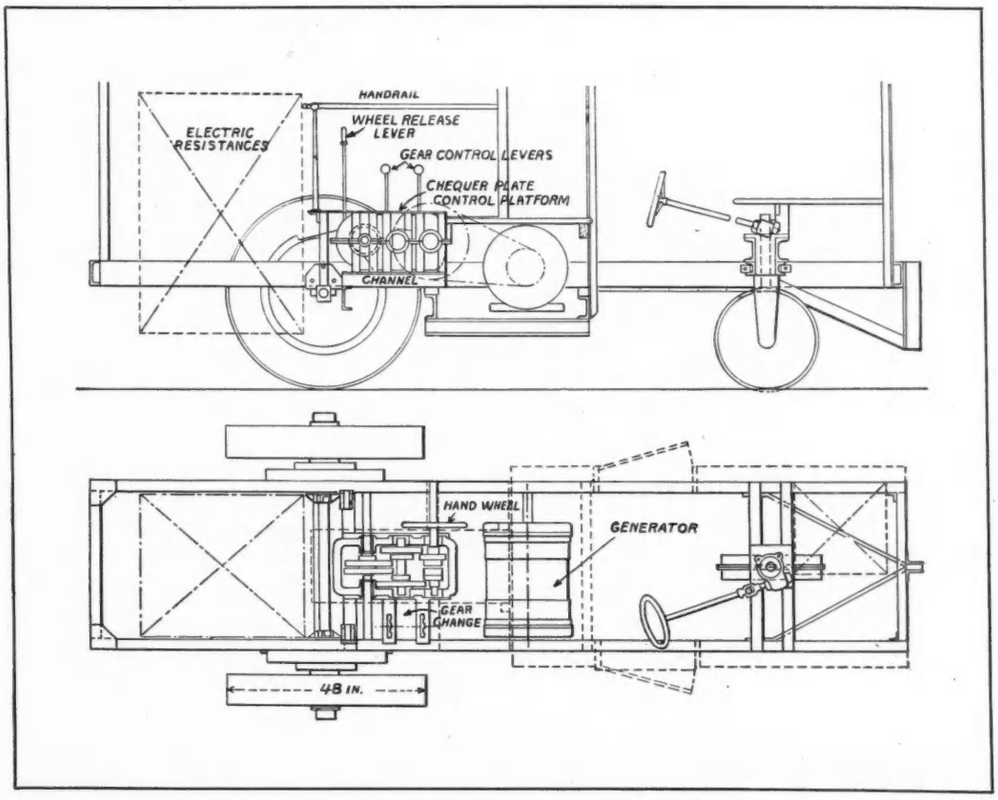
Institute of Agricultural Engineering, Built Dynamometer Car for Testing

FOR the trials of agricultural tractors which was held at Wallingford, England, last year a special dynamometer car was built to determine the tractive force and the traction horsepower which the various tractors could develop at different speeds. When the tractor industry was in the development stage in this country, about a decade ago, dynamometer tests were frequently made, and one of the manufacturers of anti-friction bearings, whose product was widely used by the tractor industry in the early days, built a special dynamometer and loaned it out to tractor manufacturers. This consisted of a device which was inserted between the drawbar and the implement hauled and registered the pull transmitted by the drawbar.

An instrument of the type described registers the draft of the implement, but it is not so suitable for trial purposes because there is no ready means at hand of varying the draft. Consequently, the Institute of Agricultural Engineering of Oxford University, which had charge of the trials at Wallingford, built a pair of dynamometer cars to be hauled by the tractors. Inside these cars there are electric generators that are driven from the cleated wheels of the dynamometer cars through automotive-type transmissions. The current generated is sent through banks of resistances exposed to cooling air currents at the rear of the dynamometer car. The pull required to move is measured by a traction dynamometer inserted between it and the tractor. Part of the car is inclosed in order to protect the instruments carried by it from the weather.

The chassis of the car is of simple design, the frame members being of rolled sections. As far as possible, standard tractor parts are used for the various components. The transmission used is a four-speed design, this making it possible to keep the speed of the generator substantially constant, whatever the speed of the car. The transmission is connected to the drive wheels through a pair of internal gears and pinions. These pinions are mounted on extensions of shafts protruding from the transmission box, and provision is made for disconnecting the drive by merely sliding the pinions along the splined shafts out of mesh with the internal gears. This, of course, is done while the car is at rest. The disconnection is effected by means of a lever inside the car.

From the plan view of the car reproduced herewith, it will be seen that in addition to the shafts carrying the internal gears at their ends, there are two other shafts in the transmission, each carrying sliding pinions operated by independent gear levers. The four



Plan and elevation of dynamometer car for tractor tests

Oxford University, Farm Tractors

wheels on the central shaft are grouped in two pairs, and two of the ratios are obtained by sliding one or the other of these pairs into mesh with the wheels on the front and back shafts. The other two ratios are obtained by sliding one or the other of the pairs into mesh with the wheels on the rear shaft and then sliding the wheel group on the front shaft into mesh with the larger wheel of the remaining pair. There is a handwheel outside the transmission housing by which the forward shaft can be turned to permit the wheels to be shifted into mesh while the central shaft is stationary. After engagement has been effected between these two shafts, further motion of the handwheel makes possible engagement between the central and rear shafts. From the forward shaft the generator is driven by a chain. The ratios obtainable in the transmission are 9, 6.6, 5 and 3.66 to 1, while the ratio between the rear shaft and the driving wheels is 4.66 to 1.

The power required to pull the car is varied by means of the resistances in circuit with the generator, and is calculated from the indications of the dynamometer and from the speed of the car. The traction dynamometer, fitted for the latter purpose, consists of two parts, the link through which the tractor pulls the car and the recording unit mounted on the car, the two portions being connected by a long steel pipe, coiled for flexibility. The link consists simply of a cylinder, filled with oil, and fitted with a plunger. The plunger is hitched to the tractor and the cylinder to the car, and the pressure to which the oil is subjected is transferred through the pipe to a smaller plunger on the recording instrument. The movement of the latter plunger is controlled by a spring, and recorded by a pen making contact with a roll of paper. The paper cylinder is driven at constant speed by clockwork, and the displacement of the pen is proportional to the pull exerted by the tractor. Two links, of different sizes, were used in the tests, the diameter of the cylinders being, respectively, 2 in. and 3 in. The small cylinder on the recording instrument is ¼ in. in diameter. The reduction ratio was thus either 64 to 1, or 144 to 1, according to the link in use. With the smaller link, pulls up to about 8000 lb. could be measured, the corresponding figure for the larger unit being 18,000 lb. A number of different springs, suitable for various ranges of load, were provided for the recording instrument.

Normally the speed of the tractor was ascertained by taking its time over a measured distance with a stop watch. In the maximum drawbar-pull test, however, it was necessary to have a continuous record of the speed, and this was obtained by the following means: A cord nearly 1000 ft. in length was wound over a drum carried on the dynamometer car. The loose end of the cord was passed over a small pulley and out under the car, being anchored to the ground. The speed was then measured by taking the speed of the pulley by an ordinary speed indicator. This arrangement proved quite satisfactory.

Fuel Survey Shows 87 Per Cent of Samples Meet U. S. Specifications

(Continued from page 439)

Copper-Strip Corrosion—No sample in this survey showed appreciable evidence of corrosion when a polished strip of copper had been immersed for three hours in the gasoline at a temperature of 122 deg. Fahr.

Distillation Range—No sample in this survey failed to meet the 75 deg. C. (167 deg. Fahr.) and the 140 deg. C. (284 deg. Fahr.) requirements of the proposed specifications.

Two competitive samples (213 and 279) failed to pass the 200 deg. C. (392 deg. Fahr.) requirement. Twenty-seven competitive samples did not reach this temperature. No competitive samples failed to pass the residue requirement.

Two competitive samples (10 and 58) could be rejected by the government, as they were procured in localities where the normal mean minimum temperature during the month of January is less than 27 deg. Fahr. because less than 10 per cent was evaporated when the thermometer read 65 deg. C. (149 deg. Fahr.).

Sulphur—Thirty-two competitive price samples, or 15.5 per cent of the total number of competitive price samples, failed to pass the sulphur requirement. The 32 samples were distributed as follows:

Boston, 1; Washington, D. C., 2; Cleveland, 3; Chicago, 4; St. Louis, 3; Minneapolis-St. Paul, 2; Omaha, 1; Dallas, 1; El Paso, 1; Salt Lake City, 1; Seattle, 3; Los Angeles, 8; San Francisco, 2.

In addition to these 32 samples there are seven samples of competitive-grade gasoline for which the sulphur content is given as "0.10+" per cent. The analysis for sulphur in these seven samples yielded an average value for each sample that was between 0.101 per cent and 0.104 per cent, inclusive. In accordance with general practice in reporting results, the figure in the third decimal place in the average was dropped. These samples are very close to failure and the plus sign has been added to distinguish them from the samples for which the sulphur content is given as "0.10" per cent.

Vapor Pressure—Only four competitive samples or 1.9 per cent of their total number had a vapor pressure higher than 12 lb. p. sq. in. Since the vapor-pressure determinations were made at a somewhat different barometric pressure than the normal barometric pressure at the point of delivery, no attempt has been made to classify the samples that might be rejected under the government option in accordance with the proposed revision of the Federal specification for U. S. Government motor gasoline.

Automotive Oddities—By Pete Keenan

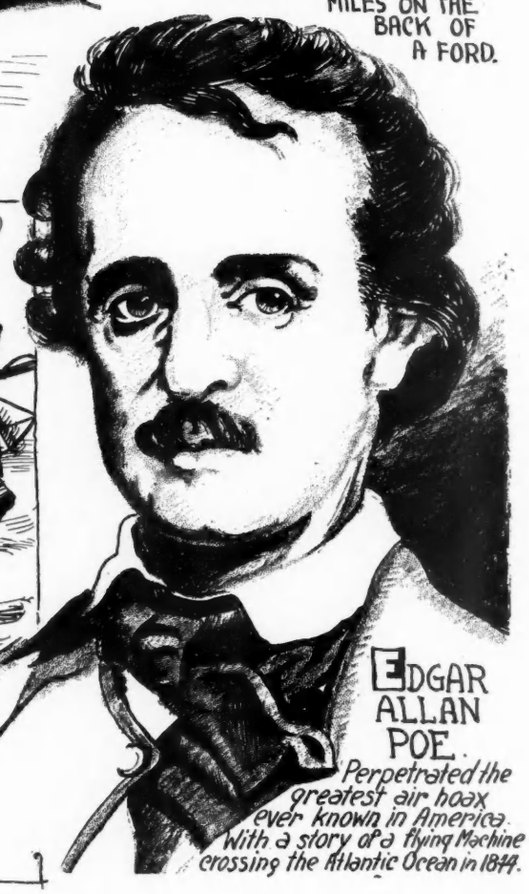
A MOUSE TRAPPED IN AN AUTOMOBILE. WAS FED DAILY FOR EIGHT MONTHS BY WILBUR C. COTY OF BROOKLYN.

IT COSTS ONLY 3 CENTS TO HAVE YOUR CAR WASHED IN CHINA.

J. C. CULLOM *Hyannis, Nebr.* CARRIED A PIANO 15,000 MILES ON THE BACK OF A FORD.

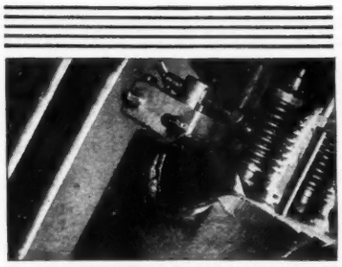
Pete Keenan

THIS ODD LOOKING CRAFT DOES 50 MILES AN HOUR AND CANNOT CAPSIZE. *Built for regular service between Vienna and Budapest. It carries 20 passengers.*

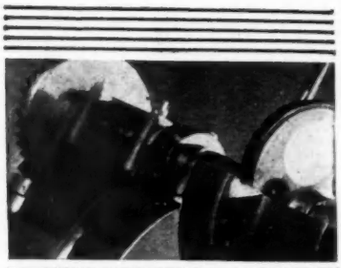


EDGAR ALLAN POE. *Perpetrated the greatest air hoax ever known in America. With a story of a flying Machine crossing the Atlantic Ocean in 1844.*

Correspondence about "Automotive Oddities" is invited. Contributions used will receive editorial mention when practicable. If you are interested in the source of, or the reason for, a particular "Oddity," ask the editorial department of Automotive Industries about it.



NEWS OF THE INDUSTRY



Reo, Packard Reduce Prices

Complete Current Line Revised by Former

DETROIT, Sept. 17—Price reductions ranging from $160 to $300 have been announced by Reo Motor Car Co. on its complete line of current models; following are new prices and reductions: Flying Cloud, $261; coupe and sedan, $995, down $300; 821 coupe and sedan, $1,195, down $200; 825 coupe, sedan and victoria, $1,565, down $180; Royale '31 all $1,985, down $160; 835 models $2,445, down $300. Equivalent reductions are effective on the sport models of these lines.

Reductions announced by Packard affect the eighth series, which has been superseded by series nine. Amount of reduction, by body types follows: Sedan, $583; touring and phaeton, $375; roadster, $440; sport phaeton and convertible coupe, $475; 5-passenger coupe, convertible sedan and sedan limousine, $535, and rumble seat coupe, $540.

Sangamo Earnings Jump

CHICAGO, Sept. 17—Net earnings of the Sangamo Electric Company for 1931 will be double the year's dividend requirements on both common and preferred stocks, it was stated yesterday by R. C. Lanphier, president of the company. The annual dividend rate is $1.00 a share on the common and $7.00 a share on the preferred stock. This would indicate that the earnings this year would be at least $2 a share on the common stock.

Johnson Joins G. M.

Courtney Johnson, former general sales manager of the Hudson Motor Car Co., has been appointed to the general sales staff of General Motors Corp. He will be associated in this capacity with R. H. Grant, chairman of the general sales committee of General Motors.

E. H. KRAMER, personnel director of Oakland, got the jump on Mr. Ford by getting the boys at work in gardens a few months ago. Employees of the company are utilizing 40 acres of land, divided into 328 plots to produce vegetables. I. J. Reuter, president of Oakland, is offering a prize for best effort.

The National Exposition of Mechanical Handling, planned for Nov. 30 in New York, has been postponed until the autumn of 1933. Suggestion for Machine Tool Builders: Get together and put on a campaign for more and better machinery in the United States mints.

The sound-accompanied film for use in sales presentations has invaded England. One of the first users is Morris Motors, auspices of W. M. W. Thomas, sales manager.

It has been customary to open the Olympia automobile show in London with a monster banquet to which all the bigshots in England are invited. This year there will be no such banquet. And 2000 individuals will buy their own dinners, provided they care to attend the show the first night.

McQuay-Norris is using cellophane to wrap replacement parts for engines, etc. That looks like the beginning of something big. Complete cars wrapped in cellophane for delivery. Ought to be a good duPont-G.M. tie-up. Drive a *fresh* automobile . . . dustproof, moistureproof, nor harsh, irritating gear noises: Cellophane-wrapped cars are kind to sales managers.

And again we bow to Chicago: The tractor has beaten the horse. Carl Shoger, Wheatland farmer, won the fifty-fourth championship plowing contest using a tractor to draw his plow. He defeated Homer Lapp, of Plainfield, Ill., champion of three previous meets. Lapp used the three horses which won for him before. Lapp lost because his furrows were not as even as those ploughed by the tractor. He complained his team was nervous from the roar of the tractor and from flies.

Electric Auto-Lite Co. has developed and started marketing an electrical synchronous clock that will retail at the lowest price of any so far introduced. Although list price has not been announced, it is thought probable that the clocks will sell for $1.

Motorists were appealed to largely in the thousands of ex-

(Turn to page 444)

THE NEWS TRAILER

August Sales Hit Low Level

Chevrolet in Lead With Plymouth Gaining

PHILADELPHIA, Sept. 17—Returns from the first 26 states to report August registrations of new passenger cars indicate that, after seasonal adjustment, sales last month touched the lowest level of the current depression. A total of about 160,000 is indicated by these partial returns, which is a 22 per cent loss from last year, and 18 per cent from July, 1931.

Chevrolet continues to lead the passenger car procession, according to these early reports, with Ford in second place, and Plymouth coming up fast, with a gain of 175 per cent over August, 1930, in this group of states. Chevrolet had a loss of 5.5 per cent from last year; Ford was 48 per cent behind. Excluding these three makes, all others combined showed a loss of 27 per cent from August, 1931.

Russian Amo Plant Nears Completion

NEW YORK, Sept. 16 — The new building of the Amo automobile plant in Moscow, U.S.R.R., are nearing completion, according to the Soviet Economic Review. Malleable iron foundry has been completed and other departments will soon be finished.

To Sell Kissel

HARTFORD, WIS., Sept. 17—Notice for the sales at auction of assets of the Kissel Motor Car Corp. on Oct. 27, has been posted by George A. Kissel and Thomas L. Davidson as receivers for the company. A bondholders' committee, representing approximately $500,000 of securities value, is expected to bid-in the property. The Fuller & Johnson Corp., Madison, Wis., has purchased the service department.

Heating Deposit Increases Resistance

Corrosive Effects Retarded by New Thermal Process

(Continued from page 424)

Chromium deposited directly on metals other than copper, such as brass, stainless steel and rustless iron, can also be heat treated in this way, with a resulting marked increase in the durability. Single layers of other metals can also be made to show a marked increase in resistance to corrosion, either by using the proper conditions for plating or by heat treatment of the deposit after plating.

In dealing with composite layers of different metals the problem is a little more difficult, since when subjected to heat the hydrogen that is driven from the lower layers of metal tends to rupture the deposits on top. This, of course, allows the corrosive agents to work their way through to the base metal and, even though the chromium is not attacked, the corrosion products from the base metal work out to the surface. We are continuing our work on this phase of the problem.

In general, we can say, however, that heat treatment of electrodeposits seems to offer to the plater a much needed means of increasing the resistance of his product to the many forms of corrosion it is called upon to resist.

Oakland Exceeds 1930

DETROIT, Sept. 14—On Aug. 13 production of Pontiac cars for 1931 had exceeded the Pontiac output for the entire year of 1930, it has been announced by Oakland Motor Car Co. Pontiac production for 1930 totaled 61,615 cars, as compared with 61,620 Pontiacs built up to and including Aug. 13 of this year.

Combined Oakland and Pontiac production for August was more than double that of Aug., 1930. The 1931 August total was 5284 as compared with 2589 for Aug., 1930. Factory officials said that September, also promises to top September of last year.

Packard "Stars" to Meet

DETROIT, Sept. 14—One hundred and twenty-five "master salesmen" of Packard Motor Car Co., will attend the seventh annual Master Salesmen's Convention, Sept. 16, 17, 18 and 19. They will assemble in Detroit on the 16th and that evening will board a special train inside the Packard factories to be taken to Lucerne in Quebec for a three-day outing.

Salesmen attending the convention and outing will be from all parts of the country. R. C. Webster, Baltimore, has won the honor of being the star among all Packard salesmen throughout the world for the third consecutive year. G. Loving, Washington, D. C., was runner-up to Webster, the champion. The contest in which they won the honor was conducted throughout the year, and was determined on the number of sales actually made.

Gets Primer Patents

CHICAGO, Sept. 15—Pines Winterfront Co. has practically completed negotiations for taking over all the manufacturing and selling operations of the Aske Fumer Co. of Minneapolis, and will move the manufacturing operations to Chicago. Pines will pay Aske on a royalty basis for the volume of Fumer business it does and will take over a nominal amount of the inventory and equipment on hand. Through this arrangement Pines will obviate the necessity of making any large capital investment as the result of the acquisition. Aske Fumer's product is an electric priming device which fumes gasoline and thereby makes starting easier in cold weather. At present, this device, which is covered by 28 patents, is standard equipment on Willys-Knight, Franklin and big Hupp.

Export Men Visit Detroit

PONTIAC, MICH., Sept. 14—A group of 30 men from the General Motors Export Corp. were here recently inspecting the General Motors Truck and Oakland Motor Car Co. plants.

Newton Offices Moved

DETROIT, Sept. 14—Sales and executive offices of the Newton Steel Co. are now located in the Fisher Building, Detroit. Other divisions have their headquarters at the Monroe, Mich., plant of the company.

To Retire Long Bonds

DETROIT, Sept. 14—Detroit Trust Co., trustee, announces that all outstanding first mortgage 5½ per cent gold bonds, dated Oct. 1, 1927, of Long Mfg. Co., will be redeemed Oct. 1 this year at $101 plus accrued interest.

Southwestern Show Planned

DALLAS, TEX., Sept. 14—The Southwestern automobile show, to be a feature of the State Fair of Texas Oct. 10-25, is now getting attention from the Dallas Automotive Trades Association.

F. J. Glennon

CINCINNATI, Sept. 14—F. J. Glennon, vice-president and general sales manager of Aluminum Industries, Inc., died in the Samaritan Hospital here, from the effects of an emergency appendicitis operation.

Develops Geared Hornet Engine

Pratt and Whitney Offers New Type With Output of 575 H.P. at 8000 Ft.

NEW YORK, Sept. 14—Pratt-Whitney Aircraft Co., East Hartford, Conn., has developed a new high compression supercharged geared Hornet engine. This new engine is labeled the Series B-1, is geared 3 to 2, and is developed primarily for military bombing planes, develops a horsepower of 775 at sea level, but will retain the horsepower rating of 575, which is its output at 8000 ft.

The new engine incorporates all the inherent features of the Series B Hornet from which it was evolved. The engine weighs 915 lb. including carburetor, running magnetos, combination hot-spot and oil regulator, air scoop, generator drive and propeller hub attaching parts, and develops 575 hp. at 2000 r.p.m. and 8000 ft. altitude. This weighs 1.75 lb. per hp. at its rated capacity, or 1.18 lb. hp. at sea level.

A combination hot-spot and oil regulator is incorporated which provides means of not only heating the mixture in cold weather, but also for cooling the oil by passing it through a radiator core placed in the intake system between the carburetor and supercharger.

The blower gearing of 12 to 1 differs slightly from the standard blowing gear used in other Pratt-Whitney engines. The most notable departure is a cage bolted to the blower section which supports the front of the intermediate and the propeller shafts, the standard intermediate shaft having no rear bearings and the impeller shaft being supported on a boss cast in the blower section.

Electric Auto-Lite Declares

NEW YORK, Sept. 14—Electric Auto Lite Co. has declared a quarterly dividend of $1.00 per share on common stock and $1.75 on preferred stock, both payable Oct. 1 to stockholders of record Sept. 23. This places the common stock on a $4.00 annual basis, as compared with the former $6.00 basis.

The News Trailer

(Continued from page 443)

hibits at the International Patent Show now in session in Chicago. Parking problems and their solutions are the big feature. "Space Condensers" and the "automatic auto parker" are attracting interest. One parks the car sideways, and the other makes the car stand on its rear wheels, engine high in the air.—H. H.

Changes in Value of Automotive Stocks on the New York Exchange

(September Bulletin of the N.Y.S.E.)

NAME OF GROUP	COMMON STOCKS					PREFERRED STOCKS				ALL STOCKS			
	No. of Companies	No. of Issues	Average Price	Total Shares Listed	Total Market value	No. of Issues	Average Price	Total Shares Listed	Total Market Value	No. of Issues	Average Price	Total Shares Listed	Total Market Value
Automobile & Truck Mfg. Co.'s (and Holding Co.'s)	23	23	$23.94	83,737,725	$2,004,416,234	7	$90.39	2,377,875	$214,941,044	30	$25.77	86,115,600	$2,219,357,278
Automobile Access. Mfg. Co.'s (and Holding Co.'s)	35	35	13.67	22,255,173	304,297,511	5	41.99	308,510	12,955,243	40	14.06	22,563,683	317,252,754
AUTOMOBILE INDUSTRY.....TOTAL	58	58	21.78	105,992,898	2,308,713,745	12	84.83	2,686,385	227,896,287	70	23.34	108,679,283	2,536,610,032
FARM MACHINERY INDUSTRY.TOTAL	7	6	27.78	8,086,516	224,649,793	5	49.40	3,139,985	155,100,528	11	33.83	11,226,501	379,750,321
AIRPLANES-A'WAYS-A'PORTS..TOTAL	9	9	9.81	16,473,464	161,635,969	2	13.69	1,380,433	18,901,732	11	10.11	17,853,897	180,537,701
RUBBER TIRE & GOODS INDUSTRY.....TOTAL	8	8	13.87	9,619,650	133,452,150	10	50.47	2,661,873	134,338,347	18	21.80	12,281,523	267,790,497
Omnibus Operating Co.'s	3	3	9.04	1,085,091	9,813,506	1	67.00	88,697	5,942,699	4	13.42	1,173,788	15,756,205

Automobiles Conquer Sahara With Oil Fuel

Three Laffly automobiles, forming the means of transport of the Benard Le Pontois scientific expedition into the Sahara, returned to Paris recently, after an absence of three months, during which they covered 8000 miles and traveled for the first time in history from the Mediterranean to the Niger valley without the aid of outside supplies.

This feat was made possible by the use of Diesel engines burning gas oil. Seventeen men were carried on the three trucks, the useful load being 3½ tons and the total load nearly 7 tons. The engine used was a twin-cylinder vertical two-stroke with opposed pistons, having a bore and stroke of 80 by 300 mm. They were built by the Societe Lilloise des Moteurs (branch of the Peugeot organization) under Junkers license, and were fitted in normal Laffly chassis having a four-speed transmission with an extra change gear giving a total of 8 forward speeds. At 1100 r.p.m. of the engine the road speed varied from ¾ to 37 m.p.h.

On starting out from Alger, each truck had a supply of 170 U. S. gallons of gas oil and 52 gallons of water for the personnel. With this fuel allowance they traveled 2170 miles across the Sahara to Gao on the Niger. While the Sahara has been crossed innumerable times by automobile, this is the first occasion the journey has been made without a chain of gasoline stations on the route. The expedition camped five days in the Tanezrouft, or Deserts of Thirst, for scientific observations.

From the Niger the expedition penetrated into the Hoogar mountains, remaining in camp for one month, and reached the Tunisian coast line without receiving outside supplies of fuel. The mountainous country along the coast through Tunisia and Algeria was followed to Alger, where steamer was taken for Marseilles.

Japanese Plan Activity

WASHINGTON, Sept. 14—The recent absorption of the DAT Motor Car Company, one of Japan's three automobile manufacturers, by the Tobata Iron Foundry again focuses attention on the consideration in Japan of plans for the formation of a domestic automobile manufacturing industry, according to advices to the Automotive Division, Department of Commerce, from Paul P. Steintorf, American Trade Commissioner, who is stationed in Tokyo.

It is reported that this merger plans to undertake the manufacture of automotive parts and accessories on an extensive scale and it is understood to have made arrangements for the flotation of a debenture issue in the amount of yen 4,000,000 to finance this business.

In view of the fact that the DAT Company has been a manufacturer of trucks, it is also to be expected that commercial vehicles will be manufactured under the control of the Tobata Iron Foundry. When the reports of negotiations regarding this purchase of the DAT Company were first announced, it was stated that the new organization would begin the production of motor trucks on a basis of all-Japanese materials. It is expected that materials from concerns affiliated with the DAT Motor Works, which include the Fuji Paint Company, the Yasuki Steel Works and the Toa Electric Company, will be used in the production of trucks. Previously, the Tobata Iron Foundry, which is closely associated with the Mitsui and Kuhara interests, had absorbed the Ajikawa Iron Works at Osaka, which has been controlled by the Mitsubishi interests.

The DAT Motor Works has manufactured motor trucks at Osaka since 1926, assisted by a subsidy from the Japanese War Office. Its minimum production capacity is 200 trucks per year, but this total has never been reached. Japan's present motor car industry, exclusive of two American assembly plants, is confined to this company; the Ishikawajima Automobile Works, with a reported capacity of 400 cars per year; and the Tokio Gas & Electric Company with a reported capacity of 300 cars per year. However, the combined production of these three companies is believed never to have exceeded 200 units per year, whereas one of the two American assembly plants in Japan has a capacity of 50 units per day and the other a capacity of 17,000 units per year.

It was regarded as of some significance in Japan that the merger of the DAT, Tobata and Ajikawa companies was announced at about the same time as the Automobile Industry Establishment Commission submitted its report to the Ministry of Commerce and Industry. This commission consists of three committees—the first to handle the matters relating to the standardization of motor cars and the experimental production of vehicles; the second, to investigate policies which should be adopted by the government for the establishment of a local industry, matters relating to the manufacture of motor cars, feasible measures for the encouragement of the use of domestic vehicles by revising motor car transportation regulations, tax systems or import tariffs and the financing of sales of Japan-made motor vehicles; the third committee to investigate the facilities of manufacturing, distribution and the financing of manufacturers.

The first report of the full commission states that if Japan can build and sell 5000 trucks a year, it will be able to establish a paying and independent motor industry. The report recommends that manufacturers concentrate on a one or two ton truck to sell for about yen 3000 (roughly $1,500).

It is reported from Japan that plans are on foot to amalgamate the three Japanese manufacturing companies. The latest plan is for these three firms to organize a joint company and allocate the production of parts to the three existing plants, while the cars are to be assembled by a new company. In this connection it is to be remembered that latest reports from Japan indicate that the DAT Company under its new ownership is to commence the manufacture of parts and accessories.

It is believed in Japan that very little actual work will be done on this project toward the establishment of a domestic industry during the remainder of 1931. The success of the plant depends to a large extent upon the amount of subsidy or other protection which the government is willing to extend. It is believed probable in Japan that the government may extend a subsidy of from yen 100 to yen 2000 per vehicle (roughly $50 to $1,000) and may also grant preferential treatment to domestic cars in respect to taxation or other government regulations.

Alfa-Romeo and Bugatti Introduce New Types At Monza Race; One Paiss 6-Cylinder Engines

PARIS, Sept. 8 *(by mail)*—Two new European speed creations made their appearance at the Italian races held on Monza track, near Milan, yesterday. Alfa Romeo produced a couple of twin sixes developing 240 hp. and Bugatti put out a couple of 300-hp. straight eights.

The Alfa Romeo comprises two complete automobiles in one chassis. Use is made of two six-cylinder, supercharged engines of 65 by 88 mm. bore and stroke, mounted side by side in a standard track chassis with the frame members set rather further apart than in normal construction. Total piston displacement is thus 214 cu. in. The engines have two overhead camshafts, a Rootes type blower with a heavily ribbed intake manifold, Memini carburetors, plain bearings, dry sump lubrication, sparking plugs in the head of the combustion chamber, and Bosch generator ignition.

Not only is each engine entirely complete, with its own radiator, oil tanks, carburetor and blower, but each one has its own clutch, four-speed transmission and driveshaft. The right-hand engine revolves clockwise and the left-hand engine anti-clockwise, thus canceling out torque reaction and adding considerably to steadiness on the road, it is claimed. The two change speed levers are united by a transverse shaft with ball and socket joints, so that the driver, who is seated in the center, can use either left or right hand, and changes gears in both transmissions simultaneously. The two clutches are interconnected to one pedal.

The rear axle comprises two spiral bevel crown wheels, with an elastic coupling between them. In the Monza races one of the cars ran with and the other without a differential. Drivers are not unanimous as to which is the better system, although the differential car probably has the advantage over a winding circuit.

Steering is in the center, with positive control to each of the road wheels, and without the use of a transverse tie rod. The front semi-elliptic springs are shackled at both ends, the axle being anchored to the frame by means of a pair of radius rods. Mechanical brakes are used, with duraluminum drums having steel liners. The diameter of the front drums is only slightly less than the wheel diameter. Duraluminum is used very extensively in the construction of these cars, and total weight in running order is only 1870 lb. Maximum speed is believed to be in the neighborhood of 160 m.p.h. On the Monza 4¼-mile track, comprising two right-angle bends and several curves, Nuvolari lapped at 101.24 miles. Under these conditions tires proved to be the limiting factor.

Bugatti has produced a new racing job with a straight-eight engine of 86 by 107 mm. bore and stroke, developing 300 hp. at 4000 revolutions. The cylinders are an iron casting carrying the nine-plain-bearing crankshaft, with an aluminum chamber built around it to serve only as an oil retainer and dust excluder. Two camshafts are fitted. The Rootes type blower is placed longitudinally, driven from the front timing gear, and is fed by a couple of Zenith carburetors. Ignition is by Scintilla magneto driven from the rear of one of the overhead camshafts. Front engine attachment is to the side rails, while rear attachment is to a steel bulkhead completely separating the engine from the driver's compartment. A four-speed transmission is used, with the normal Bugatti types of rear and front axles. Standard track is employed, with aluminum wheels cast integrally with the brake drums. Frame members are of exceptional height where the load is carried, reducing at each end. Weight of the car is 2090 lb. in racing trim.

In a 60-mile race on Monza track, Varzi won with one of these cars at an average of 98½ m.p.h., defeating the new "twin six" Alfa Romeos. The 16-cylinder Maserati, which holds the world's ten kilometers record, was completely outclassed by both the Bugatti and the Alfa Romeos. Tires proved to be the limiting factor in the speed of the new Bugatti.

Petroleum Imports Drop

NEW YORK, Sept. 16—Imports of petroleum at the principal ports of the United States for the week ended Sept. 12 have been estimated by the American Petroleum Institute at 164,714 barrels daily. This compares with the daily average of 260,714 barrels for the week ended Sept. 5, and with 185,964 barrels daily for the four weeks ended Sept. 12. Crude runs to stills during the week are placed at 2,459,900 barrels daily. Cracked gasoline produced during the week was placed at 3,563,000 barrels.

Moore Enlarging Shop

SPRINGFIELD, MASS., Sept. 17—Moore Drop Forging Co. is reconstructing and enlarging the shop principally used for the machining of forgings for automobile hinges. Orders in hand and in prospect are expected to result in the largest volume of production of the present year by Nov. 1.

Triplex of Eng. Declares

NEW YORK, Sept. 16—Triplex Safety Glass Co., Ltd., of London, has declared a dividend of 10 per cent, less tax of five shillings.

Aero Passenger Traffic Down

But Mail Flown Increases Over First Half of 1930 Period

WASHINGTON, Sept. 16—Scheduled air transport lines operating in the United States and with extensions to Canada, the West Indies and Latin America, flew more than 20,000,000 miles and carried 193,651 passengers, 4,589,707 lb. of mail and 1,299,863 lb. of express during the first six months of 1931, according to the results of a survey just completed by the Aeronautics Branch of the Department of Commerce.

The amount of mail carried represented an increase of more than a half million pounds over the first six months of 1930 and there also was an increase of 54,386 lb. in express shipments over the same period last year. Passenger traffic, however, showed a decrease of 14,706 over the corresponding period in 1930. Direct comparisons are made between corresponding six months periods of calendar years, as weather conditions usually are more favorable during the last half of the year, and this fact is reflected in the totals.

The total number of miles flown in scheduled operations during the first half of 1931 represented an increase of 3,401,702 miles over the same period last year. However, the total number of passenger miles flown (a passenger mile being the equivalent of one passenger flown one mile) showed a decrease from 52,264,616 in the first half of 1930 to 47,501,901 in the first half of 1931.

Comparisons between the first half of 1931 and the first half of 1930, for domestic operations and foreign extensions to Canada, the West Indies and Latin America, and for all routes, follow:

Domestic

	January-June, 1931	January-June, 1930
Miles flown	18,129,168	14,595,915
Passengers flown	169,816	185,956
Express (pounds)	1,129,076	1,242,458
Mail (pounds)	4,332,714	3,761,376
Mail payments	9,160,260.88	6,954,808.45
Passenger miles	40,855,654	40,319,602

Foreign (Canada, West Indies and Latin America)

Miles flown	2,175,262	2,306,813
Passengers flown	23,835	22,401
Express (pounds)	169,887	3,019
Mail (pounds)	256,993	189,420
Mail payments	$3,464,772	$2,217,367.17
Passenger miles	6,646,247	11,290,147

All Routes

Miles flown	20,304,430	16,902,728
Passengers flown	193,651	208,357
Express (pounds)	1,299,863	1,245,477
Mail (pounds)	4,589,707	3,950,796
Mail payments	$12,625,032.88	$9,172,175.62
Passenger miles	47,501,901	52,264,616

La France Designs Twenty-Ton Truck

It Has Twelve-Cylinder Engine And High Speed

DETROIT, Sept. 16—The "Highway Mogul," a 20-ton, 240-hp., 12-cylinder truck is announced by the LaFrance-Republic Corp. of Alma, Mich. Designed for fast hauling of freight the truck is said to be capable of developing a speed of around 60 m.p.h. in high gear with a 6 to 1 axle ratio, and a speed of 32 m.p.h. in second gear.

Its power plant consists of an American-LaFrance 12-cylinder engine of the type developed by this company for its fire engines, a Long Model 34A two-plate, 14-in. clutch, and a Brown-Lipe Model 714 four-speed transmission mounted in unit with the engine.

An unusual feature of the Highway Mogul, or Model Q, is that the six-wheel unit, which is available in either worm or double reduction drive, is mounted directly to the frame on trunnions without intermediate springs. Road irregularities with the loaded truck are absorbed by the tires, large-diameter, low-pressure tires being used. Elimination of the springs in large six-wheel units has a number of advantages. It enables the truck designer to either increase his frame width, or his tire size, or both, and still remain within the 96 in. legal limitations. With a six-wheel unit, of course, the shock loads are considerably less than with a single-axle design, and vertical displacement of the frame is also cut in two. The elimination of the springs also results, of course, in a considerable reduction in weight.

Bore and stroke of the Model Q is 4 by 5 in. for a piston displacement of 754 cu. in. The peak horsepower or 240 is developed at the relatively low engine speed of 2900 r.p.m. Cylinders are of chrome-nickel iron, cast in one block with dry sleeve inserts. Carburetion and ignition are both of the dual type, the engine carrying a total of four six-cylinder distributors.

To operate the air brakes, a Westinghouse air compressor is mounted on the engine, and is lubricated directly from the engine oil pump. 17¼ in. brake drums are used on all six wheels, supplemented by a double shoe 16 in. true stop disk brake on the drive shaft.

The truck is also available with two-wheel equipment at the rear, in which case 60 by 4 in. rear springs and 21 by 5½ in. rear brake drums are used. Frames in either case are of heat-treated alloy steel with 12 in. max. depth side rails, tapering to 9 in. at the front and 8 in. at the rear end. Both top and bottom flanges are 3½ in. wide, and the frame is provided with numerous reinforcements both inside and outside. An inter-axle differential is used with the six-wheel type of design.

Following are specifications of the Model Q:

Wheelbase	Up to 260 in.
Gross vehicle weight	40,000 lb.
Tire size	10.50/20 or 24
Engine make	American La-France 312B
No. cyinders	12
Bore and stroke	4 x 5 in.
Piston displacement	754 cu. in.
NACC rating	76.4 hp.
Max. brake hp.	240 at 2900
Valve arrangement	
Diam. main bearings	3½ in.
Length main bearings	10 in.
No. of main bearings	4
Oiling system	Full pressure
Radiator make	Perfex
Clutch type	2 plate
Make	Long 34-A
Diameter	13¾
Transmission make	Brown-Lipe 714
Location	Unit
No. forward speeds	4
Universals	Blood Bros.
Rear axle	Timken SWD-410 or SD-410
Final drive	Worm or double reduction
Gear ratio	6 to 1
Optional	5 4/6 and 6 4/5
Reduction in low	34.6
Front axle	Timken 27450W
Brakes, service	Westinghouse
Hand brake	True stop
Frame dimensions	12 x 3½ in.
Springs, front	44 x 3
Rear	None with six-wheel

Wins Monza Prix

PARIS, Sept. 7 *(by mail)*—Fagioli, driving a new, 183-cu.-in., supercharged, straight-eight Maserati, won the Monza Grand Prix, near Milan, yesterday, with an average of 96.6 m.p.h. over a distance of 150 miles. Borzacchini, on a straight-eight Alfa Romeo, was second; with Varzi, on Bugatti, third, and Nuvolari and Minozzi, each on Alfa Romeo, dead heat for fourth place. Lehoux and Chiron, each on Bugatti, were flagged when a part of the crowd of 60,000 spectators got out of hand and invaded the track.

This race was preceded by a series of 60-mile heats under piston displacement limits, the four leaders qualifying for the final. Fagioli qualified in his class at 96.9 miles average. The feature of these trials was the heat for the two new 300-hp. Bugattis and the two new twin-six Alfa Romeos. Varzi won on Bugatti at 98.5 miles, while the other three cars qualified. In the final, the new cars were handicapped by reason of tire failure.

Industry Buys 25 Per Cent of Tires

Direct Sales Take This Proportion, 1929 Census Study Shows

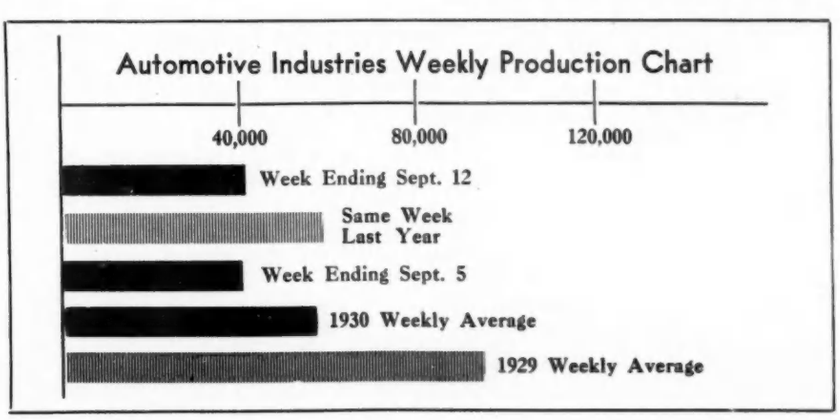
WASHINGTON, Sept. 17—Reports received by the distribution of sales from 91 manufacturing plants engaged primarily in making rubber tires and inner tubes give total 1929 sales of $770,177,000, of which 48.5 per cent, or $373,314,000, represented those made to the manufacturers' own wholesale branches. The remaining sales were made as follows: To industrial consumers, such as automobile manufacturers, operators of truck fleets, buses, etc., 25.6 per cent, or $197,383,000; to retailers, 17 per cent, or $131,207,000; to wholesalers, 8.2 per cent, or $62,939,000; to manufacturers' own retail branches, 0.5 per cent, or $4,136,000, and direct to private owners, 0.2 per cent, or $1,198,000.

Of the sales to dealers and industrial consumers, $15,426,000 was made through manufacturers' agents, selling agents, brokers, or commission houses. Eleven manufacturing plants sold through such agents, five of them selling their entire output in this way.

The report covers sales channels of the reporting plants which are engaged chiefly in making pneumatic tires, inner tubes and solid tires for trucks. The sale of other products made by these plants, amounting to approximately $93,000,000, is also included in the report.

Willys Passes Dividend

NEW YORK, Sept. 16—The Willys-Overland Co. has omitted the quarterly dividend of $1.75 on preferred stock due at this time. Under the indenture of the stock, control of the company passes to preferred stockholders if the dividend is omitted for three successive quarters, and preferred stockholders obtain voting power over common stockholders if four dividends are not paid. It is said that John N. Willys and associates hold most of the preferred.



Men of the Industry and What They Are Doing

Curtiss Names Allard

Curtiss-Wright Corp. has elected John S. Allard as president of the Curtiss-Wright Flying Service, succeeding Major E. H. Brainard, resigned. Mr. Allard has been vice-president of Curtiss-Wright Export Corp. for the past three years and will retain that position.

With the appointment of Mr. Allard as president of the Flying Service, he announced a change in policy of that company. While all kinds of flying service will continue to be handled, the company will concentrate primarily on sales and service to private owners and operators of aircraft.

Spillane and Hunt Shifted

R. A. Spillane has been appointed manager of the Philadelphia district, according to an announcement by L. G. Peed, general sales manager of the De Soto Motor Corp. Mr. Spillane succeeds F. M. Hunt, who has served as manager of this Eastern district for the past two years. Mr. Hunt returns to the home office in Detroit on a special assignment.

Evans Elects Blackburn

L. A. Blackburn, formerly works manager for Oakland Motor Car Co. and electrical engineer for the du Pont interests for many years, has been elected president of the Evans Appliance Co., makers of fuel, oil and water pumps for Diesel and internal combustion engines.

Lowes Succeeds Hedberg

Joseph E. Lowes, Jr., has succeeded Stanley Hedberg as advertising and publicity director of the Pratt & Whitney Aircraft Corp., Hartford, Conn. Mr. Hedberg left Hartford recently to join the Hudson Motor Car Co. in Detroit.

Gabriel Names Harris

George H. Ralls, vice-president and general manager of the Gabriel Co., Cleveland, has announced the appointment of Mark Harris as chief engineer. Among the manufacturers Mr. Harris has served are the General Motors Corp., H. H. Franklin Mfg. Co. and the American Steel Foundry.

Kreusser Leaves Fisher

O. T. Kreusser has resigned as research engineer, Fisher Body Corp., to become Director of the Museum of Science and Industry, Chicago. He is taking up his new duties immediately. Due to this change in the location of his work, Mr. Kreusser has resigned also as chairman of the Detroit Section of the Society of Automotive Engineers.

Alex Taub, development engineer, Chevrolet Motor Co., has been chosen to succeed Mr. Kreusser as chairman of the Detroit Section.

Proposes Biennial Show

LONDON, Sept. 6 *(by mail)*—Sir Herbert Austin is leading a movement among British manufacturers to cease holding the Olympia Show every year, and a proposal that it shall be a biennial instead of an annual event is to be brought forward shortly at a meeting of the Council of the Society of Motor Manufacturers. At a gathering of Austin dealers, Sir Herbert said that two or three years ago he persuaded the council to agree to a proposal of his to the same effect, but that at a subsequent meeting at which he was not present, the decision was rescinded.

The principal objections to the annual show are the cost it involves to the individual manufacturer and the virtual stagnation in sales that occurs during the preceding two or three months, buyers waiting to see what the show will reveal in new models and prices. A biennial show would, however, involve a big financial sacrifice by the society, for its other activities on behalf of the industry are very largely dependent upon the profits of the annual passenger car show.

August Employment Drops

DETROIT, Sept. 16—Automobile plant employment in Michigan as of Aug. 15 totaled 150,912 compared with 159,176 in July and 189,599 in August last year, based on reports of 71 companies, according to the state department of labor and industry. The aggregate weekly payroll was $3,617,641 against $3,592,311 in July and $4,519,538 in August, 1930. The average weekly earnings per capita were $23.97 in August, $22.57 in July and $23.84 in August last year.

Tire Co. Chartered

BATON ROUGE, LA., Sept. 16—The Standard Tire & Rubber Company, which is planning the establishment of a tire manufacturing plant in Hammond, has just been granted a charter by the secretary of state. T. C. Gould is president. G. E. Knowles, of Trenton, N. J., will be factory manager.

Sparks Reports Profit

DETROIT, Sept. 16—Sparks-Withington-Jackson, Michigan, reports for year ended June 30, net profit of $126,009 against net profit of $1,738,617 last year. Current assets stood at $4,829,856 on June 30, compared with current liabilities of $398,620.

Sales Tax Plan Meets Opposition

Political, Industrial And Labor Interests Join Forces for Fight

WASHINGTON, Sept. 17—The proposal of Senator Reed, Republican, of Pennsylvania, for a tax of one-half of 1 per cent on all retail sales has met with vigorous opposition. An assessment that would be so far-reaching that it would directly affect every household in the country and be a burden to many industries, such as the automotive industry, which sells at retail, the proposed tax has proved so unpopular that serious doubt exists that it will stand any chance of passing Congress, if introduced. Nevertheless, those opposing it are waging a relentless attack on it in a determined effort to prevent its adoption.

Industrial and retail interests opposing it have been joined by independent Republicans and independent Democrats in Congress, by the American Federation of Labor and other sources.

While the Hoover administration apparently is hoping to avoid new taxation at the next session, the feeling grows that it will be necessary, since the huge Treasury deficit continues to grow, and indications for a business pickup to sufficiently recoup the Treasury appear to be slight.

The chief opponents to new taxation who have voiced their views on the subject are Senator Watson of Indiana, and Representative Tilson of Connecticut, Senate and House majority leaders respectively of the last Congress. Manifestly, both are close to the Hoover administration. Yet the same may be said of Senator Reed and Representative Bacharach, Republican, of New Jersey, who also has proposed a tax program, widely divergent from the Reed program. Without going into detail, it may be stated the Bacharach program would impose higher taxes on wealth, by raising surtax rates, and making greater assessments on gifts, estates and inheritances. His tax, it goes without saying, has met with much popularity and may get much support from the independent members of Congress, including Democrats and Republicans. Mr. Bacharach is a prominent member of the Ways and Means Committee of the House and Mr. Reed is ranking Republican member of the Senate Committee on Finance, the two revenue raising committees of Congress.

The Bacharach program may meet with considerable opposition, however, from independent Democrats and Republicans, as well as from retail and industrial interests opposing a sales tax. Their attitude probably will depend on a clearer definition of what Mr. Bacharach has in mind in his proposal to place a sales tax.

Sheet Steel Price Change Heralded

Possibility of Michigan Basing Point Persists in Current Reports

NEW YORK, Sept. 17—Automobile sheets are the only description of finished steel products in which there is likelihood of a price change for fourth-quarter commitments. Reports persist that a Michigan basing point will sooner or later be established for full-finished automobile sheets and the price adjusted on that basis. A Middle West "independent" announced unchanged fourth-quarter prices for black and blue annealed sheets a few days ago, and this has been accepted in the market as representative of the policy of sellers as a whole. Black sheets are now selling at $7 per ton below the low of 1921. Steel bars, shapes, and plates continue to be quoted at 1.60c., Pittsburgh, or $3 to $5 per ton higher than during the first quarter of 1922 when the lowest price since 1915 was chalked up.

Hot-rolled strip steel prices for the fourth quarter are to continue on the unchanged basis of 1.55 and 1.65c., Pittsburgh, for the wider and narrower sizes, respectively, but the prevailing 2.15c., Pittsburgh, price for cold-rolled strip steel is to apply strictly to round lots, and 2.25c. is to be the going price for smaller quantities. Volume of business in hand and coming to mills from automotive consumers, while by no means spectacular, is in pleasing contrast with buying by most of the other steel consuming industries, many of which continue out of the market altogether.

Pig Iron—Automotive foundries are calling for more iron than they have in quite a few weeks. Very little in the way of contracting, however, is being done, most of the buying being in single carloads to be shipped at once. Quotations remained unchanged.

Aluminum—Development of new alloys for airplanes is being pushed by aluminum alloy specialists. Demand for piston metal is mildly improved. Quotably the market is unchanged.

Copper—Resellers were offering copper at 7¼ cents, delivered Connecticut, early this week, the market's statistical position and bear maneuvers on the London Metal Exchange being the cause of intensive weakness.

Tin—Straits tin sold at the beginning of the week at 25½ cents. In Singapore and Penang there were more buyers than sellers and New York importing interests emphasized the difficulty of replacing tin sold at prevailing New York prices in the Eastern markets.

Lead—Quiet and unchanged.

Zinc—Dull and easy.

Rubber Consumption Off

NEW YORK, Sept. 14—Consumption of crude rubber in the United States for the month of August is estimated by the Rubber Manufacturers Association as being 27,586 long tons. This compares with 31,937 long tons in July, and with 30,575 long tons in August of last year. Imports for the month were 38,370 long tons, as compared with 41,004 long tons in July, but 10.3 per cent above Aug. 1930.

Domestic stocks, as of Aug. 31, are estimated at 240,816 long tons, an increase of 2.5 per cent over July, and 51.8 per cent over Aug., 1930. Crude rubber afloat in United States ports on Aug. 31 is estimated at 61,469 long tons, as against 66,873 of July 31, and 61,168 on Aug. 31 last year.

Chevrolet Sweeps Indiana

INDIANAPOLIS, Sept. 15—After having led in Indiana new car registration for most of the year, Chevrolet in August finally captured the last big stronghold, Marion county (Indianapolis). With a total of 1220 new cars registered Chevrolet leads Ford by 320 in the state and seventy-two in Marion county. Plymouth has shown its head among the leaders with 649 cars registered. Registrations for August this year show a decline of 717 cars over last year, but 10 manufacturers have shown gains in sales over the same period last year. Chevrolet gained 59, Ford lost 919 and Plymouth's gain amounted to 415. It has been noted in motor circles here that the Ford loss is greater than the industry loss for the month. July registration for all makes for the state was 4549.

Detroit Section Elects

DETROIT, Sept. 15—E. V. Rippingille, General Motors Corp., has been elected chairman of the Passenger Car Activity of the Detroit Section, Society of Automotive Engineers, filling the vacancy caused by the resignation of E. S. MacPherson, assistant chief engineer, Hupp Motor Car Co.

Robert N. Janeway, Chrysler Corp., will have charged of the student activities work of the Detroit Section for the remainder of this year. Mr. Janeway takes over the work which has been proceeding under the direction of Alex Taub, the latter having become chairman of the Section.

Curtiss Sells to Panama

NEW YORK, Sept. 14 — Curtiss-Wright Export Corp. has sold to the Republic of Panama three Curtiss-Wright airplanes for government work, two of these being Wright Whirlwind Travel Air Speed Wings and one a Wright Whirlwind Keystone Commuter. The Keystone will be used for police work and as an emergency hospital as well as to carry mail and freight. The Travel Air Speed Wings will be used in patrol work and will be fitted with armament.

Bus Operators to Meet

NEW YORK, Sept. 14—The National Association of Motor Bus Operators will hold a two-day convention at the Ambassador Hotel, Atlantic City, Sept. 28 and 29.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, Sept. 16 — General business was featured last week by a slight increase in wholesale and jobbing trade. Retail trade was at a fair level, for the opening of the schools tended to stimulate buying. Collections throughout the country remained slow.

DEPARTMENT STORE SALES

Department store sales during August, according to the Federal Reserve Board, increased less than the usual seasonal amount. The index of these sales for August stood at 90, as against 91 for July and 95 a year ago.

CAR LOADINGS

Railway freight loadings during the week ended August 29 totaled 763,764 cars, which marks an increase of 15,053 cars above those during the preceding week, but a decrease of 220,746 cars below those a year ago and a decrease of 220,746 cars below those two years ago.

BUSINESS FAILURES

Commercial failures during August, according to R. G. Dun & Co., totaled 1944, as against 1983 during July and 1913 a year ago. The reduction in August was 2 per cent, whereas the decline during August in recent normal years has been somewhat larger.

EMPLOYMENT

The number of workers employed in representative New York state factories during August declined 1½ per cent, while payrolls dropped about 1 per cent.

WHEAT ESTIMATE

According to the latest report of the Department of Agriculture, the production of winter wheat is placed at 775,000,000 bushels, as against 612,000,000 bushels harvested last year. Spring wheat is placed at 111,000,000 bushels, as against 251,000,000 bushels produced last year. The production of corn is estimated at 2,715,000,000 bushels, as against 2,094,000,000 bushels last year.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended September 12 stood at 68.9, which is the same as the index number for both the week and two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City during the week ended September 9, which included only five business days, were 37 per cent below those a year ago.

STOCK MARKET

The stock market last week declined further. The liquidation is attributed to an accumulation of bad news, particularly that concerning dividend reductions and the proposal for Congress to appropriate a further bonus to veterans.

BROKERS' LOANS

Brokers' loans in New York City during the week ended September 9 declined $41,000,000, bringing the total down to $1,325,000,000.

RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended September 9 showed few substantial changes. The reserve ratio on September 9 stood at 79.5 per cent, as against 79.4 per cent a week earlier and 79.9 per cent two weeks earlier.

Effort Pays in Europe, Says J. V. Lawrence

NEW YORK, Sept. 17—Consistent and intelligent sales effort will produce increasing results in the European market in spite of the economic and political situations prevailing there today, John V. Lawrence, European representative of the National Automobile Chamber of Commerce, told the Overseas Automotive Club at its first meeting of the fall season today.

Mr. Lawrence cited two or three examples of where intelligent effort properly applied, with due diligence, resulted in increased sales in the European market during 1930, as compared with 1929 and had showed a continued increase during the first half of the current year. Style appeal is not necessarily an essential to this increase as evidenced by some of the instances Mr. Lawrence cited.

As a result of his two and one-half years in Europe, Mr. Lawrence feels that the greatest possibilities for the automotive market for the immediate future lie in the north, east and southeast portions of the continent.

Show Dates Set

PHILADELPHIA, Sept. 17—At the meeting of the National Association of Show & Association Managers, held in Toronto last week, the following dates for major automobile shows were announced by the managing officials concerned:

Detroit, Jan. 23 to 30.
Washington, D. C., Jan. 30 to Feb. 6.
Montreal, Jan. 23 to 30.
St. Louis, Feb. 7 to 12.
Cleveland, Jan. 30 to Feb. 6.
Cincinnati, Jan. 17 to 23.
Pittsburgh, Jan. 23 to 30.
Philadelphia, Jan. 16 to 23.
Kansas City, Feb. 7 to 14.
Newark, N. J., Jan. 16 to 23.
Peoria, Ill., Feb. 9 to 14.
Baltimore, Jan. 23 to 30.

Plans Boat, Engine Show

NEW YORK, Sept. 17—A motorboat and marine engine show, occupying all four exhibit floors of the Grand Central Palace, will be held Jan. 22-30, according to Henry R. Sutphen, president of the National Association of Engine & Boat Manufacturers. In making this announcement Mr. Sutphen pointed out that registrations of boats in the class above 16 ft. and under five net tons had shown an increase of 2430 during the first six months of this year as compared with the first six months of last.

Citroen to Speak in U. S.

NEW YORK, Sept. 15—Andre Citroen, French automobile manufacturer, will be the speaker at the banquet of the Conference of Major Industries to be held in the Waldorf-Astoria Hotel, New York, Oct. 21. This conference is held under the auspices of the Meat Packers Institute and Columbia University, operating jointly.

New Speed Mark Set in Air Race

PHILADELPHIA, Sept. 17 — Racing only against time, Flight Lieut. J. H. Boothman of the British Schneider Trophy team won the trophy permanently last Saturday for England by setting an average pace of 342.9 m.p.h. for the 100-km. run. The previous record, set by the late Lieut. H. R. D. Waghorn, the 1929 winner, was 331.75 m.p.h.

Following Boothman's flight, Lieut. G. H. Stainforth, also of the British team, took his seaplane around the course at an average of 379 m.p.h., reaching a speed of 388.67 m.p.h. for one lap, a world's record for vehicular speed in any medium.

It was thought at the conclusion of the trials that Lieutenant Stainforth had reached a lap speed of 404 m.p.h., but comparison of the stopwatch times with the automatic timing device records reduced the figure as reported above.

Show Managers Meet

TORONTO, ONT., Sept 14—Col. Robert E. Lee, St. Louis, presided at the meeting of the National Association of Automobile Show Managers, held last week at the Royal York Hotel, this city. For the first time in the history of the association it took on an international aspect in that it elected Adelstan Levesque, manager of the Montreal Automobile Trades Association, a member. There were present automobile show association presidents from 25 of the most important cities of the United States, including New York, Chicago, Cleveland, Philadelphia, Boston, San Francisco, Denver, Kansas City and Detroit.

Stalingrad Output Reported

NEW YORK, Sept. 16—The Soviet tractor plant at Stalingrad produced 1866 units during the month of August, the largest production reported yet by this plant. The production for the first eight months of this year was 11,618 tractors.

The "Red Putilov" plant produced 1855 tractors in August or 9183 during the first two-thirds of 1931. The total output of the Soviet tractor industry thus becomes 20,801 for the first eight months, as compared with 13,400 for the whole of 1930.

Baush Increases Force

SPRINGFIELD, MASS., Sept. 17—Baush Machine Tool Co. has increased its force to fill rush orders from leading automotive concerns for multiple drilling machines. Forty or more large machines of this type are being put in production.

Plans Canadian Plant

WELLAND, ONT., Sept. 15—The old carbon alloy plant on Dennistoun Street, Welland, Ont., which has been idle for many years, has been acquired from Robert S. Hart of Hamilton, Ont., by the American Manganese Steel Co., Inc., Chicago Heights, Ill. The latter company is proceeding to incorporate a Canadian company in which the title will be vested, and according to W. M. German, K.C., who has been in charge of legal arrangements, it will probably be called Canadian Manganese Steel Co., Ltd. The property acquired is situated on the west bank of the Welland ship canal, with a long frontage on Dennistoun Street. Substantial structures on the property include a two-story brick office building and a main manufacturing building 80 x 500 ft. It is expected that the purchasers will expend $200,000 or more in rebuilding and equipping the plant, which, when in operation, will employ between 200 and 500 men.

G. M. Gains in Canada

OSHAWA, ONT., Sept. 15 — According to William C. Herring, general sales manager of the General Motors of Canada, Ltd., Chevrolet in the first seven months of 1931, in the four eastern zones of General Motors of Canada, actually exceeded its sales in the same area for the same period last year. Chevrolet also considerably increased its percentage in its particular price field. The increase was something like 55 per cent. Pontiac and Oldsmobile also increased their percentage of sales in their price fields by 17 per cent and 30 per cent respectively.

Vail Assigns Patents

CAMDEN, N. J., Sept. 14—A method of selective-clutch construction which makes it possible to operate the member either automatically or manually has been perfected by Henry H. Vail, and a patent has been issued to him protecting 14 claims.

In his application, filed at the United States Patent Office May 22, 1929, Vail gave notice of assignment of his rights under the award to the Automatic Drive & Transmission Co. of Gloucester, N. J., of which he is president.

Van Norman Ships to Soviet

SPRINGFIELD, MASS., Sept. 17—Van Norman Machine Tool Co. has begun shipping heavy grinders for ball-bearing raceways, of which it has an order for 65 from the Russian government. Negotiations are in progress for another lot, almost as large, of the same machines. The plant is working overtime to fill orders for grinding and milling machines.

Packard Motor Car Co. is advertising nationally, over the signature of Alvan Macauley, president, a plea for "an hour's work in place of a dollar of dole."

Summary of Recent International Speed Records on Land

(Certified by Association Internationale des Automobile-clubs Reconnus)

Record Distance or Time	Start	Date	Place	Sponsor	Driver	Car	No. of Cylinders	Displacement in C. C.	Time or Distance Run H. M. S. 1/100	Speed in Kilometers	Speed in M.P.H.
					Class E						
50 K.	S	July 8	Montlhery	W. D. Hawkes	Mrs. G. M Stewart	Derby-Miller	8	1612	14′ 41″ 89	204.107	126.83
50 M.	S	July 8	Montlhery	W. D. Hawkes	Mrs. G. M. Stewart	Derby-Miller	8	1612	23′ 26″ 60	205.944	127.97
100 K.	S	July 8	Montlhery	W. D. Hawkes	Mrs. G. M. Stewart	Derby-Miller	8	1612	29′ 05″ 43	206.253	128.16
					Class G						
50 K.	S	August 7	Montlhery	G. E. T. Eyston	G. E. T. Eyston	Riley	4	1086	17′ 07″ 06	175.258	108.90
50 M.	S	August 7	Montlhery	G. E. T. Eyston	G. E. T. Eyston	Riley	4	1086	27′ 40″ 66	174.437	108.39
100 K.	S	August 7	Montlhery	G. E. T. Eyston	G. E. T. Eyston	Riley	4	1086	34′ 30″ 16	173.900	108.06
100 M.	S	August 7	Montlhery	G. E. T. Eyston	G. E. T. Eyston	Riley	4	1086	55′ 32″ 35	173.860	108.03
200 K.	S	August 7	Montlhery	G. E. T. Eyston	G. E. T. Eyston	Riley	4	1086	1 h 08′ 51″ 84	174.257	108.28
1 H.	S	August 7	Montlhery	G. E. T. Eyston	G. E. T. Eyston	Riley	4	1086	173 k. 980	173.980	108.11
					Class H						
1 K.	F	August 8	Brooklands	Sir H. Austin	L. Cushman	Austin	4	744.7	21″ 87	164.609	102.28
1 K.	F	August 12	Brooklands	Viscount Ridley	Viscount Ridley	Ridley Spec.	4	746	21″ 22	169.651	105.42
1 K.	S	August 8	Brooklands	Sir H. Austin	L. Cushman	Austin	4	744.7	34″ 41	104.621	65.01
1 M.	F	August 8	Brooklands	Sir H. Austin	L. Cushman	Austin	4	744.7	35″ 76	162.014	100.67
1 M.	F	August 12	Brooklands	Viscount Ridley	Viscount Ridley	Ridley Spec.	4	746	34″ 43	168.273	104.56
1 M.	S	August 8	Brooklands	Sir H. Austin	L. Cushman	Austin	4	744.7	48″ 57	119.284	74.12
					Class J						
3 H.	S	May 24 & 25	St. Germain	Antony	Antony	Antony	2	344.32	167 k. 290	55.763	34.65
6 H.	S	May 24 & 25	St. Germain	Antony	Antony	Antony	2	344.32	276 k. 316	46.053	28.62
12 H.	S	May 24 & 25	St. Germain	Antony	Antony	Antony	2	344.32	502 k. 157	41.846	26.00
24 H.	S	May 24 & 25	St. Germain	Antony	Antony	Antony	2	344.32	777 k. 001	32.375	20.12

K—Kilometer(s) M—Mile(s) S—Standing start F—Flying start

Aero Accidents Gain

WASHINGTON, Sept. 15—There were five fatal accidents in more than 20,000,000 miles of scheduled air transport flying during the first six months of 1931, according to the semi-annual report of the Aeronautics Branch on civil aircraft accidents in scheduled air transport operations for January to June, 1931, announced today by Colonel Clarence M. Young, Assistant Secretary of Commerce for Aeronautics. Three of these accidents involved passenger fatalities.

As compared with the corresponding six-month period of 1930, the passenger miles flown per passenger fatality showed an increase of more than 100 per cent. (A passenger mile is the equivalent of one passenger flown one mile.) In the first six months of 1930 the passenger miles flown per passenger fatality were 2,375,664; in the first six months of 1931 the passenger miles flown per passenger fatality were 5,277,989. This was due to an increase in the number of miles flown and a decrease in the number of passenger fatalities. Miles flown in scheduled operations of American-owned aircraft increased from 16,902,728 in the first half of 1930 to 20,304,430 in the first half of 1931, while passenger fatalities decreased from 22 in the 1930 period to 9 in the 1931 period.

The total number of accidents of all kinds—minor and serious—increased in the 1931 period over the first half of 1930, and although the number of miles flown was greater this year, there was a decrease in the number of miles flown per accident. The statistics showing these facts are:

For the period January to June, 1930, there were 44 accidents in 16,902,728 miles of flying, making the number of miles flown per accident 384,152, whereas, for the period January to June, 1931, there were 61 accidents in 20,304,430 miles of flying, making the number of miles flown per accident 332,860.

Urges Wider Employment

NEW YORK, Sept. 14—The Rubber Manufacturers Association, at a meeting of its directors held last week, adopted a resolution recommending to the industry that in order to give employment to the greatest number of people every effort should be made by all rubber manufacturers to maintain the present force, even if a reduction in hours becomes necessary. This policy should apply to all classes of employees.

Smith Escapes Injury

V. M. Smith, factory manager, Continental Motors Corp., escaped serious injury when a Continental Motors airplane, a four-seater Waco cabinplane, nosed over after making a forced landing during a rainstorm near Ionia, Mich., recently. His pilot, R. N. Labadie was also injured.

S.-P.-A. Exports Increase

DETROIT, Sept. 14—For the fifth consecutive month Studebaker-Pierce-Arrow Export Corp. showed an increase over corresponding month last year in shipments to foreign dealers when August shipments exceeded August, 1930, by 55 per cent.

Reo Adds 339 Dealers

LANSING, Sept. 14—New dealers to the number of 339 have been added by Reo since July 1, according to an announcement released by E. G. Poxson, general sales manager.

Ohio Employment Up

COLUMBUS, OHIO, Sept. 14—The Bureau of Business Research of Ohio State University, in a bulletin covering employment in the automobile and automotive parts manufacturing industries, shows that August employment in Ohio was 3 per cent greater than that of July and 8 per cent less than in August, 1930. The increase in August over July compared favorably with the five-year average July-to-August decline of 3 per cent. Of the 36 concerns reporting, 15 showed increases in August over July, 18 showed decreases and 3 showed no appreciable change. Average employment for the first eight months of the year was 15 per cent below the levels of the corresponding period in 1930.

Employment in the tire and tube manufacturing industry in Ohio during August was 3 per cent less than that of July which compared unfavorably with the usual seasonal condition of stability as gained by figures over the past five years. In comparison with August of last year employment receded 22 per cent. Average employment for the first eight months of the year was 25 per cent below the levels of the corresponding period last year. Of the 11 concerns reporting for August, 4 showed increases, 6 reported decreases and 1 showed no change in August employment levels as compared with the month of July this year.

P. & W. Gets Large Orders

HARTFORD, CONN., Sept. 14—Pratt & Whitney Co. has announced orders totaling $300,000 for machine tools for automotive concerns in Detroit. A part of the orders includes an assignment to make 26 grinders.

Number of General Motors' Stockholders Reaches Record Level

The total number of General Motors common and preferred stockholders for the third quarter of 1931 was 293,714 compared with 285,655 for the second quarter of 1931 and with 249,175 for the third quarter of 1930.

There were 276,476 holders of common stock and the balance of 17,238 represents holders of preferred stock. These figures compare with 268,400 common stockholders and 17,255 preferred for the second quarter of 1931.

The total number of stockholders of both classes by quarters since 1917 follows:

Year	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1917	1,927	2,525	2,669	2,920
1918	3,918	3,737	3,615	4,739
1919	8,012	12,523	12,358	18,214
1920	24,148	26,136	31,029	36,894
1921	49,035	59,059	65,324	66,837
1922	70,504	72,665	71,331	65,665
1923	67,115	67,417	68,281	68,063
1924	70,009	71,382	69,428	66,097
1925	60,458	60,414	58,118	50,917
1926	54,851	53,097	47,805	50,369
1927	56,520	57,595	57,190	66,209
1928	72,986	70,399	71,682	71,185
1929	105,363	125,165	140,113	198,600
1930	240,483	243,428	249,175	263,528
1931	286,378	285,655	293,714*	

*Preferred stockholders of record July 6, 1931, and common stockholders of record August 15, 1931.

To Study Labor Problems

NEW YORK, Sept. 14—The National Automobile Chamber of Commerce at its directors' meeting last week appointed a committee to represent that body in a study of the labor situation, and to seek additional information whereby motor manufacturers may relieve unemployment distress. This committee consists of A. R. Erskine, president of the Studebaker Corp., as chairman; Robert W. Woodruff, chairman of the White Motor Co., and L. A. Miller, president of the Willys-Overland Co. Alvan Macauley, president of the chamber and also president of the Packard Motor Car Co., is one of the industry's representatives on President Hoover's committee on unemployment relief.

In appointing this committee, Mr. Macauley said: "With one out of every 10 wage earners in the United States depending directly or indirectly upon the automobile industry for support, our manufacturers are earnestly seeking to do everything within their power to meet the situation."

Marketing Wire Gage

NEW YORK, Sept. 14—George Scherr & Co., Inc., are now marketing in this country an instrument for gaging the thickness of wire and other comparatively small objects, under the name of Optotest. This instrument is a product of Carl Zeiss Co., Jena, and has a magnification of 1000 to 1. This instrument is said to be one of the simplest optical gages on the market.

Ross Reduces Rate

CHICAGO, Sept. 14—Common stock of the Ross Gear & Tool Co. has been placed on an annual dividend basis of $1.20 with the declaration of a quarterly distribution of 30 cents a share, according to announcement Thursday. The dividend is payable Oct. 1 to stockholders of record Sept. 20. In the preceding four quarters the company paid quarterly dividends of 50 cents a share each, prior to which the share was $3 a share annually.

Graham Sales Gain

DETROIT, Sept. 14—A gain of 29 per cent in the ratio of Graham registrations to the total registrations in the United States, since the introduction of the Prosperity Six, is reported in a summary transmitted to Graham dealers by C. W. Matheson, general sales manager, Graham-Paige Motors Corp.

"Official registration figures," says the statement, "show that the total for all makes decreased 6.7 per cent in May, as compared with April, while Graham, which introduced the Prosperity Six in May, gained 3.0 per cent over the previous month. In June, when registrations of all makes for the entire country slumped 18.5 per cent, Graham registrations dropped only 3.5 per cent.

"In comparing June with April, which was this year's biggest month in registrations, it is found that the entire industry showed a 24 per cent seasonal decrease in June, while Graham registrations decreased less than 1 per cent."

Dodge Adds 226 Dealers

DETROIT, Sept. 14—Dodge Brothers added 226 new dealers to their distributing organization throughout the country during July and August, according to a factory bulletin from A. vanDerZee, general sales manager.

+ + CALENDAR + + OF COMING EVENTS

SHOWS

Olympia Passenger Car Show, London .....Oct. 15-24
Olympia Truck Show, London..Nov. 5-14
Passenger Car Show, Glasgow..Nov. 13-21
Motorcycle Show, London..Nov. 30-Dec. 5
Pittsburgh, Pa., Automobile...Jan. 23-30
Newark, N. J., Automobile.....Jan. 16-23
Salon, New York City.....Nov. 29-Dev. 5
Salon, Chicago .....Jan. 30-Feb. 6
Salon, Los Angeles, Calif.....Feb. 13-20
Salon, San Francisco, Calif..Feb. 27-Mar. 5

CONVENTIONS

Eastern States Exposition, Springfield, Mass. .....Sept. 20-26
American Welding Society, Boston, Mass. .....Sept. 21-25
American Electric Railway Assn., Atlantic City, N. J.....Sept. 26-Oct. 2
S.A.E. National Production Meeting, Detroit .....Oct. 7-8
National Safety Council, Chicago, Ill. .....Oct. 12-16
Society Industrial Engineers, Pittsburgh, Pa. .....Oct. 14-16
Transportation Meeting, S.A.E., Washington, D. C. .....Oct. 27-29
American Chemical Society, Buffalo, Aug. 31-Sept. 4
American Society Mechanical Engineers (General Meeting), Kansas City .....Sept. 7-9
W. Va. Motor Transportation Assn., Charleston .....Sept. 11
Society for Elec. Development, New York City .....Sept. 11
Steel Founders Society, Chicago..Sept. 17
American Institute Mining and Metallurgical Engineers—Iron and Steel Division, Boston .....Sept. 21-24
American Society for Steel Treating (National Metal Exposition), Boston .....Sept. 21-25
American Society Mechanical Engineers—Machine Shop Practice, Boston .....Sept. 21-26
American Gear Mfg. Assn., Pittsburgh .....Oct. 15-17
National Hardware Assn., Chicago, Oct. 19-22
American Iron and Steel Institute, New York City .....Oct. 23
American Railway Assn.—Motor Transport Division, Chicago.....Oct. 27-28
American Society Mechanical Engineers—Annual meeting, New York City .....Nov. 30-Dec. 4
American Roadbuilders Association, Detroit, Mich. .....Jan. 11-14, 1932
U. S. Good Roads Association, Birmingham, Ala. .....Oct. 12-15
Associated Business Papers, Chicago, Ill. .....Oct. 19-21

Continental Passes Dividend

NEW YORK, Sept. 14—Continental-Diamond Fibre Co. has omitted the dividend on capital stock, due at this time. The company states that it has taken this step in order to conserve its strong treasury position and for the best interests of the stockholders.

"Disc wheels for me"

"I want wire wheels on my car"

"I'll stick to the artillery"

Yet all can have wheels of steel

Steel is the universal material for wheels to-day. But all motorists do not agree on the type of steel wheel to use. Budd, by recently perfecting the steel artillery wheel, is now able to meet this difference of opinion with a steel wheel to satisfy every preference. And each type is interchangeable on the same hub. Budd Wheel Company, Detroit, Philadelphia.

BUDD-MICHELIN WHEELS

STEEL DISC
(Lacquered or stainless steel.)

STEEL WIRE
(With painted spokes, stainless steel spokes, stainless steel sheaths, or Snapspokes.)

STEEL ARTILLERY
(Lacquered, chromium plated, or stainless steel.)

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Buffalo 16 in. Sliding Head Drill

To meet the demand for a general purpose production drill, the Buffalo Forge Co., Buffalo, N. Y., has placed on the market the 16-in. sliding head drill. Capacity in steel: 9/16 in.; in iron: ⅞ in.

The sliding head is keyed to the column and has a vertical range of 8½ inches. The ground spindle sleeve is fed by a substantial pinion on the feed lever shaft.

Spindle drive is through a four-step

V-belt cone pulley which is mounted on a sleeve running in SKF ball bearings.

Speed changes are easily made by loosening one knurled hand wheel and moving the motor bracket in by means of rack and pinion. The belt may be flipped into the desired step and slack taken up and the rack locked in a few seconds.

The motor is a standard ball-bearing, vertical motor of 1/3 to ¾ hp., according to the duty. Floor space—floor type, 36 x 36 in. Net weight—floor type, 372 lb.; bench type, 332 lb.

J-Metal for Cutting Tools

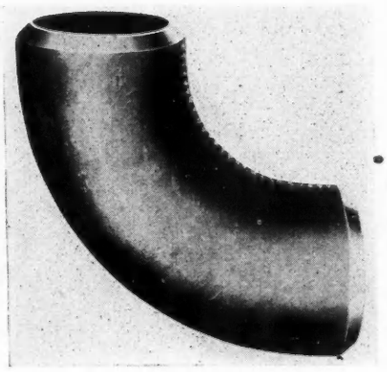
Probably the most recent innovation in the cutting tool field is the introduction of J-metal, a special grade of Haynes stellite developed for cutting cast iron, semi-steel and steel, by Haynes Stellite Co., Kokomo, Ind. Production tests on actual operations have shown that J-metal, with the same feed and depth of cut usually used when turning cast iron and semi-steel with grade 3 Haynes stellite cutters, will operate at a maximum speed 50 per cent greater than was formerly possible for the most efficient results. At this higher speed the number of pieces per grind will equal that normally produced at slower speeds. At the same speed, feed and depth of cut, J-metal will show an increase in cutting life of at least 100 per cent over grade 3 Haynes stellite, and a ratio of 4 to 1 over the number of pieces formerly obtained per grind has been demonstrated by actual tests.

Haynes stellite J-metal shows these same superiorities over standard Haynes stellite in those steel cutting operations where Haynes stellite tools are now used.

Midwest Welding Fittings

An important piping development permitting welded construction has been made by the Midwest Piping & Supply Co., Inc., St. Louis, Mo. According to a recent announcement, they have placed on the market a line of fittings comprising welding heads, welding sleeves, welding ells and welding saddles. These fittings are available in a variety of sizes.

The ells, one of which is illustrated here, are made to exact radius and sectional diameter and in perfect round—



the result of a special compression sizing operation. Unique fixtures used in machining the bevel on the ends assure an included angle of exactly 90 deg. or 45 deg. Inspection is rigid, and every ell is subjected to a hydrostatic test pressure 25 per cent greater than the mill test of the corresponding pipe.

Midwest welding ells have tangents which are an important feature because they reduce the time and cost of installation. They make it possible to more quickly and accurately line up the pipe and fitting. The welds are more accessible and are removed from the point of maximum bending stress. One-quarter inch of tangent is provided for each inch of pipe diameter; thus an 8-in. ell has tangents 2 in. long.

Clark 3-Ton "Trucktier"

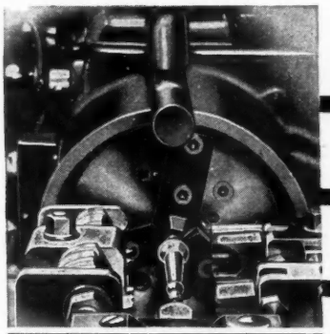
A tiering truck that steers with all four wheels, drives from the rear wheels and is powered with a tractor-type gas engine capable of twenty-

four hours' continuous operation is announced by the Clark Tructractor Co., Battle Creek, Mich. The turning radius is 94 in. and the truck will easily negotiate the corner of two intersecting 64 in. aisles with ample clearance on each side. The hydraulic lift applies maximum power to point of service without drum or other complicated mechanisms. Besides utilizing all the advantages of the hydraulic lift it cushions the descending load without shock.

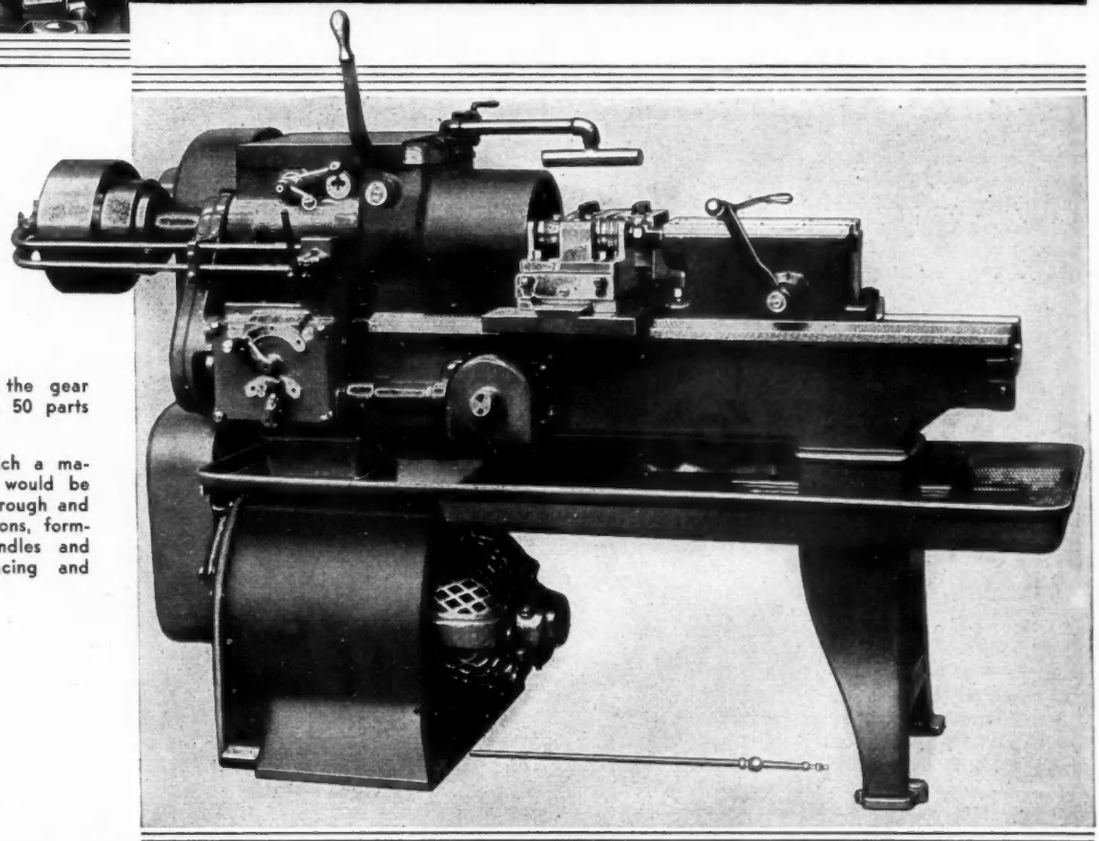
The "Tiertop" model is especially recommended for factory and warehouse use. It tiers a three-ton load to 6 ft. in 30 sec. Heavy dies may be positioned on presses, heavy units in process may be positioned on machine tools, material for storage is quickly and compactly tiered.

The "Tiermor" model tiers 3 tons to 4 ft. in 18 sec., and due to its low overall height, is especially adapted to loading and unloading freight cars. It enters the car and takes the load to the far end, spots it where it is to ride, and comes out of the car with no jockeying.

(Turn to page 456, please)



WHY A SPECIAL DESIGN?



The production on the gear shift lever shown is 50 parts per hour.

Other parts on which a machine of this type would be desirable would be rough and finish grooving pistons, forming ball crank handles and numerous small facing and forming jobs.

LE BLOND

Manufacturers have found that profitable production results from having a special machine for a special purpose.

For years LeBlond engineers have designed machines with this idea pre-eminent, yet planning so that the same piece of mechanism will work efficiently on other jobs as well.

This has resulted in recognized LeBlond leadership in the industrial field for over forty years. Perhaps we have the solution to your problem. Let us consult with you.

THE R. K. LeBLOND MACHINE TOOL CO.

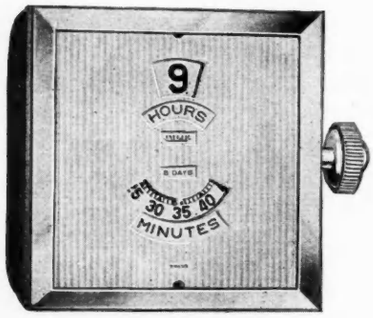
CINCINNATI, OHIO

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Jaeger Automobile Timepiece

The Jaeger Watch Co., Inc., 304 East 45th Street, New York City, manufacturers and distributors of the internationally known Jaeger 8-day automotive clock, have just announced the addition to their line of a new and quite novel 8-day automobile timepiece. This timepiece, known as the



Jump hour clock, tells at a glance the exact time in hours and minutes without requiring the customary figuring.

The Jump hour clock comes in either a dull nickel or chromium case, which is set off by a beautiful silver rippled dial. The case is so constructed that overhead installation above the windshield is quickly and neatly accomplished. From this vantage point, the time is not only available to the driver but to every car occupant.

Cincinnati Automatic Infeed Accuracy

We are advised by the Cincinnati Grinders, Inc., that the limits of accuracy on the automatic infeed for multiple diameter work are plus or minus 0.0002 in. This is within the limits demanded by modern precision grinding practice. A description of this new attachment appeared in *Automotive Industries*, Sept. 5, 1931.

Hammond Automatic Composition Feeder

An automatic composition feeder has been placed on the market by the Hammond Machinery Builders, Kalamazoo, Mich., for use on full automatic, semi-automatic, hand polishing and buffing machines now in service. It is said to reduce cost of materials and time of applying composition to polishing and buffing wheels.

It is operated by means of compressed air. The composition paste is delivered through a distributing nozzle direct onto the polishing or buffing wheel. The centrifugal force of the wheel carries the composition to a collector pad which is clamped on one end of the nozzle. This collector pad presses against the polishing wheel. The proper amount of composition can be fed to the wheel either constantly or intermittently. If the latter is preferred, either a hand or foot control is supplied. The feeding nozzle is equipped with adjustable discharge spout, which may be adjusted for flat, irregular or curved contours of polishing or buffing wheels. This nozzle is supplied in sections and can be built up to lubricate any width of wheel. A flexible hose permits a wide adjustment of contact points.

Tallow, Tripoli, stainless steel or white lime can be purchased in drum containers in paste form for use with this unit.

Ramet Toolpak

The Ramet Toolpak, consisting of five small Ramet-tipped tools of tantalum carbide, a rugged tool holder and a special grinding wheel, all packed in a finely finished wooden case, has recently been developed by the Ramet Corp. of America, North Chicago, Ill.

Two right-hand, one left-hand, one round-nosed and one grooving tool contained in the set adapt it to the varied jobs of ordinary shops.

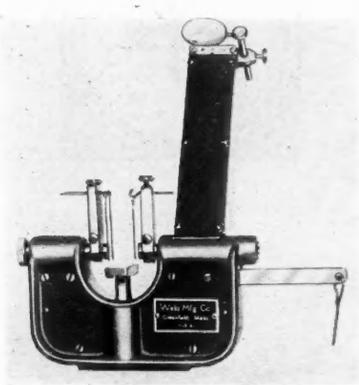
Heretofore the advantages and economies of Ramet tools have been available only to large production plants because of cost. The Toolpak overcomes this limitation by providing a number of inexpensive Ramet tool bits of various shapes to handle a wide variety of work.

An important innovation in these Ramet tool bits is the use of shanks made of a special metal having practically the same coefficient of expansion as Ramet. This metal was developed by Dr. C. W. Balke, Director of Research, and overcomes many of the difficulties previously encountered in the use of steel shanks. This special metal also has great advantages in the manufacture of large Ramet tools, especially those having tips of unusual size or shape.

Ramet tools should be ground on suitable wheels in order to get a keen cutting edge and to minimize the amount of metal removed in sharpening. A special grinding wheel which will fit practically all bench grinders is furnished.

Wells Rapid Thread Gage

A precision inspection gage for rapid gaging of threaded parts has been placed on the market by the Wells Mfg. Co., Greenfield, Mass. It is of the comparator type and provided with a device for magnifying readings over 300 times. Operation is by means of a foot treadle. Pressure on the treadle opens the gage for the work to enter; when the pedal is released, the reading is instantly made.



This gage is made in two styles; the three-wire arrangement illustrated, for extreme accuracy; and a similar unit with anvils for ordinary inspection of taps and screws. Both styles have a capacity of 0 to 1 in.